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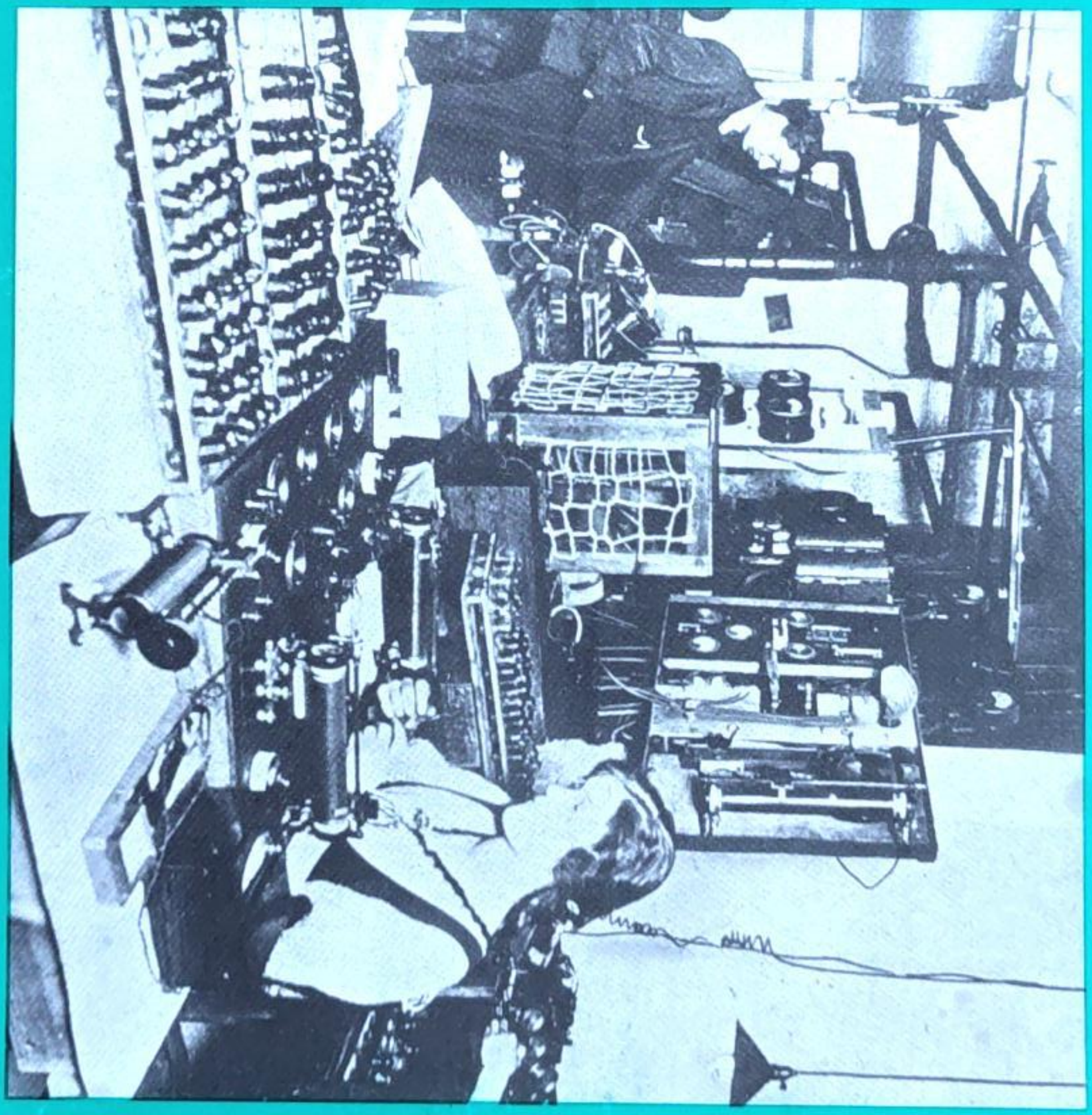

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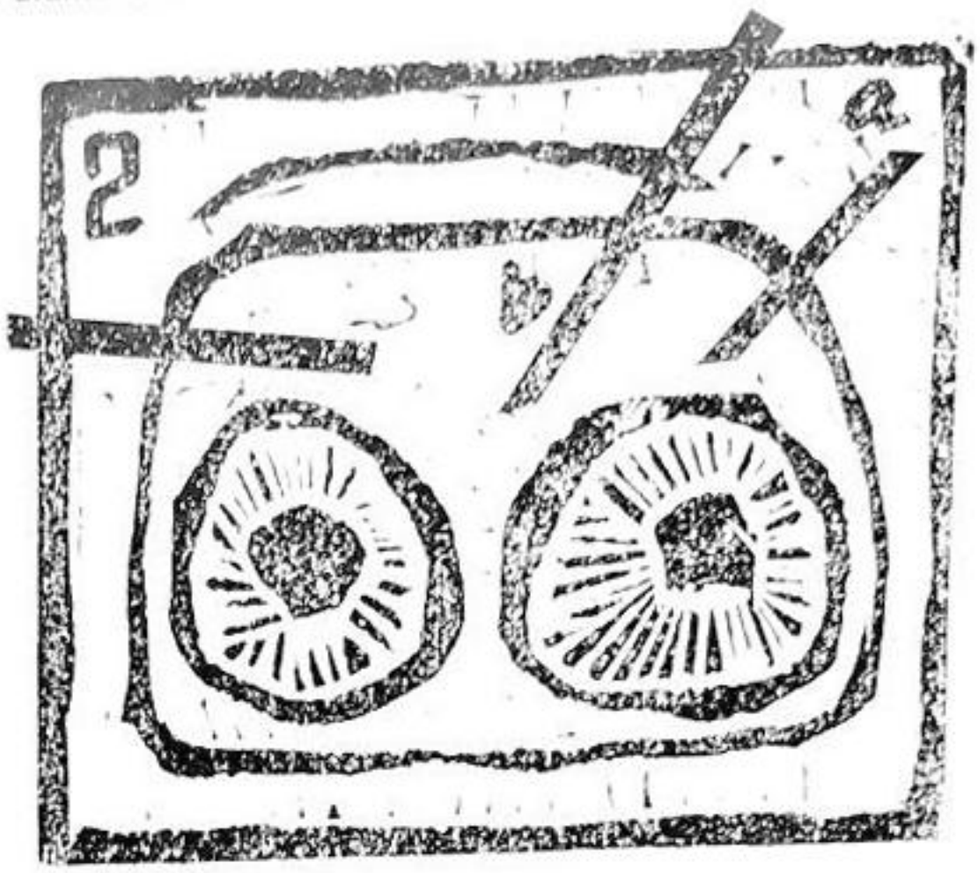

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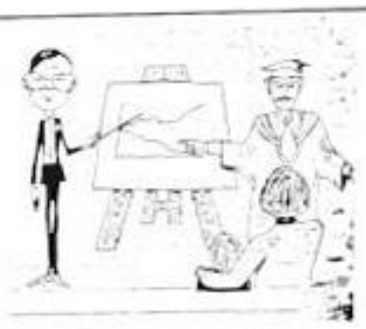

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SUMMER 1987 ISSUE 64

Science for People is the quarterly magazine of the British Society for Social Responsibility in Science (BSSRS). The Society was set up in 1968 and consists of socialists concerned with the issues surrounding science and capitalist society. The office is at 25 Horsell Rd, London N5. Tel: 01-607 9615
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The winning entry of the SF short story competition

MICROELECTRONICS – MACROEXPLOITATION

Microelectronic technology is based on the exploitation of women in Third World countries. *Ruth Wilson* reports on the practices of the Transnational Corporations and the effects on their female workforce.

> "We need female workers; older than 17, younger than 30; single and without children; minimum education primary school, maximum education one year of high school; available for all shifts."

This ad was run by a US multinational corporation in a Mexican newspaper and it signals a dramatic shift in world employment patterns over the last 20 years. In Third World countries, the profit-hungry transnational corporations (TNCs) have found a labour force which is massive, cheap, disposable and unprotected by legislation. 90 per cent of the workers on this global assembly line are women, and they work in appalling conditions for minimal pay.

The new international division of labour has been made possible by the evolution of the microchip. Developments in transport systems and communications technology have enabled US and European corporations to locate labour-intensive production work in less developed countries, while keeping knowledge-intensive specialised work in the North.

Microtechnology is itself one of the largest industries to be farmed out to different countries. After the invention of the transistor in 1947, electronics technology developed in California through research done at Stanford University. Large Pentagon contracts helped finance the research, leading to the formation of 'Silicon valley' near Santa Clara, where most of the largest companies have their head offices.

Shifting Labour Patterns

The microscopic size of the semiconductor makes it easy to transport and therefore particularly suitable for manufacture in Third World countries. At first companies used labour in Mexico to carry out assembly line work, but in the '60s they moved into Asia. Today there are factories throughout the world, with a high concentration in South East Asia.

Different parts of the production process can be carried out in different countries. "Circuits are printed on silicon wafers and tested in California," write researchers Barbara Ehrenreich and Annette Fuentes. "Then the wafers are shipped to Asia for the labour-intensive process by which they are cut into tiny chips and bonded to circuit boards; final assembly into products such as calculators or military equipment usually takes place in the US."

Between 80 and 90 percent of the low-skilled jobs in the Third World are performed by women

The reasons for this shift in employment lay in the TNC's urge to maximise profits. But with backing from the International Monetary Fund, the World Bank and US Aid, the move was sold to Third World countries as "export-oriented industrialisation". Governments of less developed countries were persuaded that by hosting TNC assembly plants they would strengthen the local economy, improve the balance of payments, and acquire the skills and know-how to set up national manufacturing industries. In fact, there has been no transfer of skills, profits are siphoned off without benefit to the local population, and even the raw materials used in the assembly plants are imported from other countries.

Despite this, governments continue to offer extremely favourable conditions to TNCs. Free Trade Zones (FTZs) have been set up in Asia, Latin America and Africa in a bid to draw in foreign investment. The zones offer a range of benefits to companies, such as freedom from taxes and export duties, low-cost facilities, exemption from labour laws, and the absence of trade unions. Armed guards, barbed wire and security checks turn many FTZs into military compounds where work conditions are terrible. A Sri Lankan woman describes a typical FTZ:

> "Of the work force in the zone, 89 per cent are women, all under 25; 80 per cent of them are single. They have been recruited from surrounding rural areas and although they cannot travel home each day the company provides no accommodation. They have to live in overcrowded boarding houses where they pay the equivalent of 50 to 70 pence per day, about half their daily wage.
>
> "Their working and living conditions are appalling. They work long hours without breaks, sometimes standing all day (8-12 hours). Their wages are so inadequate that they need to work overtime or are forced into overtime because production targets within the factories are set so high. Most of these young workers are treated as casual labour so that the fear of losing their jobs makes them work even harder. Inadequate transport services to the boarding houses mean that they get home late with no time left for themselves."

In her book, *Common Fate, Common Bond*, Swasti Mitter reports that there are now more than a million workers employed in FTZs. They work mainly in textiles, clothing manufacture and microelectronics, and most of them are women.

Across the world, women are the shop-floor workers in the microelectronics industry. In California, 90 per cent of the assembly workforce is female, and many women are immigrants from Central America and Asia. Between 80 and 90 per cent of the low-skilled assembly jobs in the Third World are performed by women. The administrative, professional and technical jobs go to men.

Shop floor of Phillip's factory, Singapore (Format Photographers)

Cheap Labour

The female labour force has special attractions for TNCs. "We hire girls because they have less energy, and are more disciplined, and are easier to control," says a personnel officer for Intel Corporation in Malaysia. A promotions ad in Thailand dwells on highly questionable 'racial' as well as 'feminine' characteristics:

> "The manual dexterity of the oriental female is famous the world over. Her hands are small and she works fast with extreme care. Who, therefore, could be better qualified to contribute to the efficiency of a bench-assembly production line than the oriental girl?"

Women are the world's cheap labour force, not because of "inherent characteristics", but because they have been relegated to the domestic sphere by the state and by the family. Capitalism has kept women outside the main labour force. Women are expected to supply free labour in the home, and their need for income is considered secondary to a man's. Lack of training and education limits womens' employment opportunities and the skills they acquire through domestic work are not considered an asset. Instead, women are expected to take on the most boring, insecure and low-paid work.

Women are forced to accept employment on the worst terms because, as Swasti Mitter points out, women workers in fact desperately need an income. They live in shanty towns and slums. Many will be the sole providers for their families, while others make a crucial contribution to the family welfare. In Malaysia, for instance, women electronic workers give up to 60 per cent of their wages to their families, despite the low level of pay.

Women are the world's cheap labour force

"In the Phillipines, starting wages in US-owned electronics plants are between $34 and $36 a month, and the basic cost of living is $37 a month per person," writes Swasti Mitter. "In Indonesia, the starting wages are about $7 less per month than the basic cost of living. And that basic cost of living means bare subsistence: a diet of rice, some dried fish and water, lodging in a small room occupied by four or more people."

The family ethos is used to demand filial obedience from the women workers. "What we are doing resembles a family system in which I am not just the manager but also a father to all of those here in Fairchild," says the manager of Fairchild's Indonesian plant. Needless to say, the sanctity of the company family does not preclude sexual abuse: "We call our company 'motel'," says a worker in the Phillipines, "because we are often told to lie down or be laid off."

Risks to Health

The impact of microelectonics manufacture on workers' health is severe, and in the US, the National Institute on Occupational Safety and Health has named the industry a high health risk. "In many plants toxic chemicals and solvents sit in open containers, filling the area with fumes that can literally knock you out," write Ehrenreich and Fuentes. Severe burns, loss of fingers and even death have been reported. Stress is high because of pressure to

meet quotas, and in particular, women suffer damaged eyesight as a result of spending seven to nine hours a day looking through microscopes.

In northern countries, some of the health risks of microelectronics are beginning to be recognised. Digital Equipment in the US recently took pregnant women off the production line when research proved that the women were more likely to miscarry. The research also noted a higher incidence of headaches, sore throats and nausea in production line workers compared to other employees (*New Scientist*, 15.1.87).

In less developed countries workers are unlikely to benefit from any health precautions. Indeed, TNCs are attracted to Third World countries because there are few regulations. Unions can be controlled, or banned and wages can be kept down. Swasti Mitter quotes the Managing Director of Hewlett-Packard Malaysia, who sums up the TNC's attitude to unions as "an unnecessary and unwelcome third party...which may even work against the good relationship between management and employees." An exhausted workforce has little time or energy to unionise; rapid turnover of workers prevents continuity of worker organisation; and the local government and military will co-operate in keeping unions out.

The microelectronics industry is volatile and unpredictable, given to booms and slumps. Today in the UK there are 28 Enterprise Zones, similar to FTZs. In Scotland, South Wales and Ireland, TNCs have moved to take advantage of cheap labour located close to the main markets. Swasti Mitter points out that in 1984, 63 per cent of US-owned electronics plants in Scotland were not unionised. While new technology establishes itself in our offices, women of the poorer parts of Britain — like women worldwide — become an easily exploited workforce. The large firms farm out parts of the production process to smaller units. Home-working, sweat-shops and small enterprise are increasingly a feature of employment patterns in Britain. Small-business owners benefit — women do the work.

Women are fighting back

Despite repression, women worldwide are fighting back. There have been several instances of mass strikes in FTZs, and in some factories women have succeeded in forming unions. In the Phillipines, there is an organisation of more than 70 womens' networks, which opposes the domination of TNCs and US imperialism. There have been a few conferences, bringing together activists, researchers, and assembly-line workers from across the world. At a London conference in 1983, organised by *War on Want* and the *Archway Development Education Centre* 170 women condemned the exploitative and divisive role of TNCs, and established an international network called *Women Working Worldwide* to disseminate information about work conditions in TNCs and the struggle for change and justice.

Ehrenreich and Fuentes call the global assembly line "one of the most strategic blocs of woman power in the world of the 1980s". The women workers need our solidarity and support.

Ruth Wilson

Women Working Worldwide is a project which aims to support the struggles of women workers through information exchange and international networking. For more information, contact: *Women Working Worldwide*, c/o ERR, 258 Pentonville Road, London N1 9JY, UK.

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"We hire girls because they are easier to control . . ."

Over one million S.E. Asian women now work for U.S. corporations, forming the central link in assembly lines that stretch from the U.S. to Asia and back again. Their salaries are as low as 80¢ a day.

"Our last winner of the company beauty contest spent $40 on her evening gown, but she made so many slits to show her legs, that she can't wear the dress anymore."

New forms of personnel control which manipulate traditional concepts of femininity, passivity, and sexuality are now being implemented by American electronics companies in S.E. Asia.

"Hey grandma! How do you like your new glasses?"

Electronics workers in Hong Kong are called "grandma" after they reach the age of 25, since by this time they need eyeglasses. Asian women work in these factories only 3 to 4 years before they suffer severe eye damage. As a result, they often lose their jobs.

"Intel doesn't believe in unions, because we believe in finding out what workers want. Our company conducts a twice yearly attitude survey."

The corporate strategy in Asia is to divert independent worker organizing, and to prevent employees from attaining their legal rights even under the limited protection of S.E. Asian regimes.

SCIENCE FOR PEOPLE

THINKING MACHINES ?

We've all heard about computers that play chess and compose music but *Ron Roberts* asks, 'Do they really think?' and even if they do, 'Why do we want them anyway?'

Artificial intelligence or AI is a field of study, which aims to produce machines which ultimately will be able to think, learn and act creatively in dealing with a wide range of problems which the human intellect has faced. Many workers now believe that to function intelligently, these machines will need a considerable knowledge of the world they inhabit, along with a sufficiently large vocabulary of words and the ability to combine these into linguistically correct forms that can both express known truths about the world and also discover new ones. The mastery of natural language thus lies at the heart of the ouest to develop intelligent machines. So we should not ask, 'how do you make a machine intelligent', but, as Dennet[1] believes, 'how is knowledge possible?'

Surprisingly, scientists are a long way from achieving this. The so called '5th generation' machines are certainly at present no more than wishful thinking.

Recognising the current state of affairs, Hofstadter[2] amongst others distinguished between *weak* and *strong* AI. The weak AI position is that computers are useful tools enabling us to formulate and test ideas of how the human mind works. However, proponents of strong AI assert that a suitably programmed computer would actually have mental states and would understand and be conscious of what it was doing.

Do machines think?

So far we have machines that play chess, or bridge, 'compose' music, play table tennis, translate words from one language into another, prove theorems in higher mathematics, write poetry and recognise complex visual patterns. It certainly would appear that the machines *understand* what they are doing; but do they?

There are many misperceptions as to what these machines can and can't do and what they do and don't do, which arise from several distinct sources, all equally important. For example, it is hard for anyone not acquainted with computer programming or complex philosophical reasoning to grasp how it could be possible to play a good game of cehss or do mathematics for instance, without in some sense engaging in thought. Then there are workers in the AI field who make extravagant claims about what particular programs are doing. But many of these programs, for which intelligence has been claimed are doing no more than mimicking the appearance of complex human functions. Notable in this class are those programs which appear to be able to engage in intelligent conversation with a human observer.

The term 'artificial intelligence' is very apt...for the intelligence, if any, is certainly artificial.

This can be no better illustrated than in the case of *Eliza*. Weisenbaum[3] describes how his *Eliza* program was mistakenly thought to be actually understanding natural language by many of the people who communicated with it. In actual fact the program merely scanned the input responses given by a person to the computer for certain key words, and in response, produced set sentences according to a relatively small number of rules for manipulating sentences and sentence fragments. It was not only intelligent lay people who misrepresented the abilities of the program. Several psychiatrists (Colby[4] for example) made the extravagant and disturbing claim that the program might be modified to form the basis of mass psychotherapy by computer terminal. Weisenbaum, however is one of the few workers in this field who are acutely aware of the dangers such ideas can lead to. He finds the idea of machines being used to replace human activity in those areas where love, compassion and empathy usually play an accepted part, as morally repugnant, no matter how 'technically feasible' they may be.

Today there are programs substantially more sophisticated than *Eliza* which work on quite separate programming principles. These 'expert systems' have been used in a wide variety of settings, from medicine to mining engineering by attempting to embody the knowledge of an expert in a particular field. One example is the expert system *Mycin* used in medicine. This program was intended to aid in the process of arriving at a diagnosis within a particular limited area. Once it has arrived at a decision, the program is then able to be interrogated as to why it has reached it. As with similar systems, this program relies on having a large database of knowledge in conjunction with a set or rules that specify the probabilities of particular outcomes (disease syndromes) being associated with the presence of various combinations of elements from the data list (symptoms).

The initial enthusiasm for expert systems has now abated, most now realise that to use and comprehend the program, the user must have a comparable degree of knowledge. This undermines the purpose of the system: that the knowledge of experts could be made available and used by those not so knowledgeable.

It has been proposed that the real goal of AI research is for men to be able to create life in the absence of their ability to conceive.

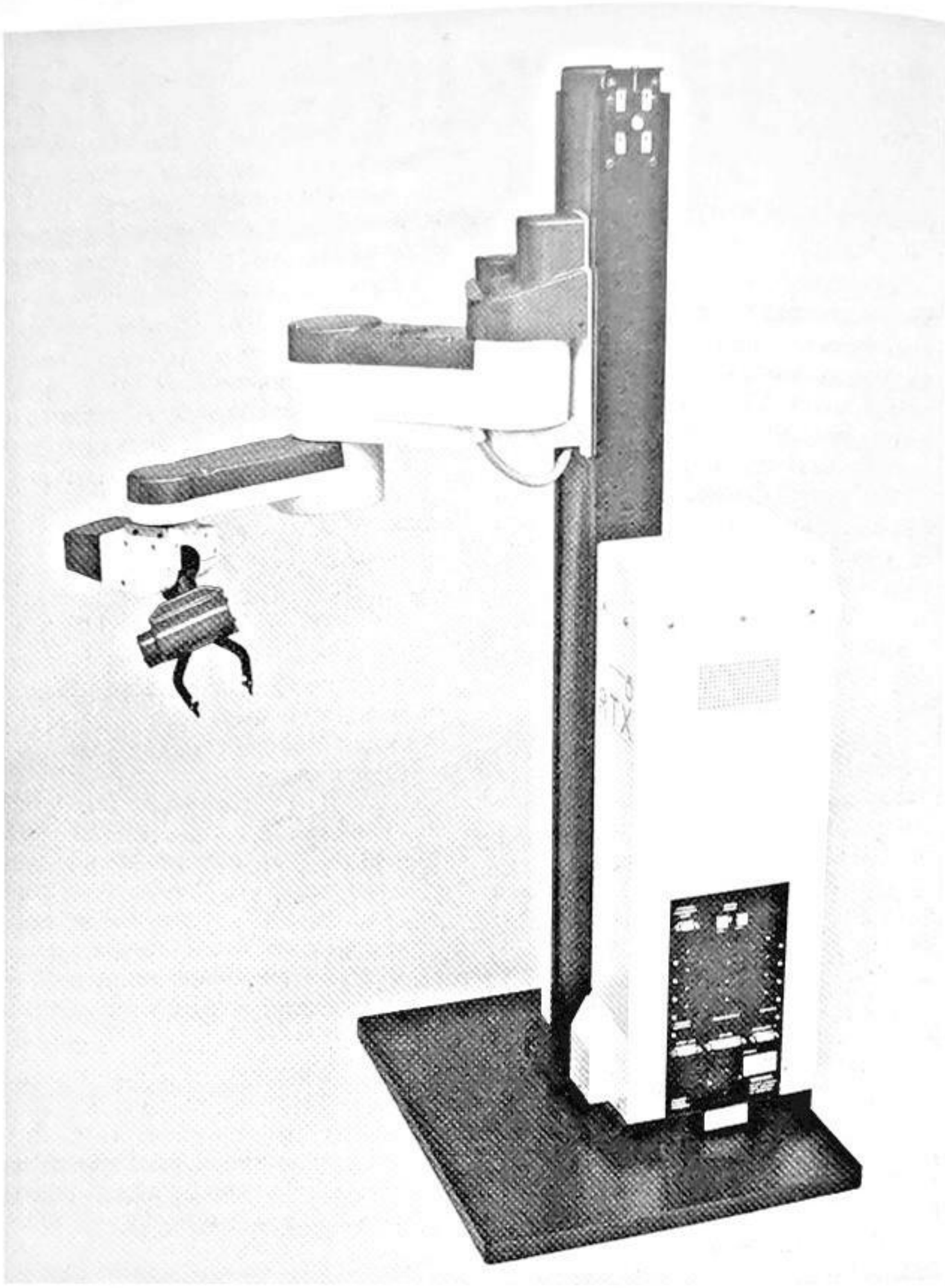
Programs of this type, performing numerous operations upon long lists of data, may outperform humans in certain tasks but do not tell us anything about human cognition. The term artificial intelligence is very apt in this context, for the intelligence, if any, is certainly artificial.

The mastery of natural language lies at the heart of the quest for intelligent machines.

Cognitive scientists now think that the development of AI may depend upon the construction of learning machines which will acquire their knowledge by means of active procedures: machines will learn and gather information by doing things. Much human knowledge, for example how to speak, play tennis, paint etc., is based on active procedures; the actions performed are themselves embodiments of knowledge. The impressive computing power exhibited by the likes of today's chess-playing machines have an overwhelming reliance on performing millions of computations per second rather than applying stored knowledge. What intelligence they do exhibit is due to the ingenuity of the programmers in devising their routines.

People as machines

There is a widespread and dangerous habit of endowing machines with human characteristics while at the same time speaking of people as if they were machines. The implicit philosophy behind this tendency has infiltrated AI research to an alarming extent. It suggests that the only problems of human psychology worthy of investigation are those aspects of human functioning which are machine computable. No doubt many human abilities can be simulated by certain algorithms[5] and heuristics[6] embodied in computer programs, but simply because this may be possible does not mean that this is in fact the way that human beings function. The philosopher John Searle has argued that the mere formal manipulation of symbols which takes place in a computer program cannot duplicate the cause and effect relationships embodied in the human brain which determine our experience and understanding of the world. Physicists have long been arguing that traditional classical logic (on which the operations of computers are founded) is inefficient for dealing with the realities of human experience.[7,8]



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"I saw it on the telly"

Another major influence on the public perception of AI is the inaccurate and misrepresentative reporting in the media (particularly television but also the press) which constantly implies that machines already exist that can talk and feel just as human beings can.

Of course science fiction films, books and plays frequently portray intelligent automatons in future scenarios, but the media does more than this. Popular TV programmes from game shows to the news show people dressed up in costumes and speaking with metallic voices and presented as intelligent robots. Perhaps this is simply meant to amuse but the end result is a public of both adults and children who are constantly being fed with incorrect and misleading images of what is currently technically possible.

This is reinforced by the portrayal of science as an all powerful, all knowing body of knowledge. It will be interesting to see how this image is affected as time passes without a cure being found for AIDS. But make no mistake, this image is a powerful one to shake. Chernobyl and the Challenger disaster have failed to awaken sufficient concern in the fallibility of human science, to have led to perceivable changes in public policy. At the present the metaphor of the machine is far from being toppled. However there is a most pervasive contra-

diction in that science and technology are seen as all powerful and yet as out of control and alienated from human needs, enough to threaten us with destruction. There is thus open a route to change the present situation.

Who wants them anyway?

To develop a fuller understanding of the social functions which artificial intelligence research is serving, we need to look further than the perceptions people have about computers. Also, why does the pursuit of AI seem to many to be of over-riding importance?

The psychological and educational culture of the last half century has been preoccupied with the question of intelligence. The concept of the IQ furnished at the beginning of the century by the Frenchman Alfred Binet has developed into a growth industry around the testing and differentiation of individuals on any number of criteria. We seem obsessed with what IQ we have. Are we above or below average intelligence? Are different races intellectually superior or inferior to other races? In fact there can be little doubt that under the cloak of science the issue of intelligence has allowed classism and racism to operate under a veneer of respectability.

Several psychiatrists made the extravagant and disturbing claim that the program might be modified to form the basis of mass psychotherapy by computer terminal.

As the world economic system lurches from crisis to crisis, the question of its continued survival has become a topic of serious discussion, even within the business community. The development of a new economic class of servile machines may therefore enable the current exploitative and oppressive system to survive one stage further. After all, artificially intelligent machines would simply do what they are told and wouldn't go on strike.

The rapid development of AI over the last 20 years has had a lot to do with the growing demands of the military for equipment which will be capable of flexible and rapid responses for for both defence and attack purposes. Cruise missiles, for instance, have the ability to continually change their direction and position to reach a designated target for attack, by inspecting the surrounding geography of the region they are in and then plotting new courses to reach their desired location.

The development of a new economic class of servile machines may therefore enable the current exploitative and oppressive system to survive one stage further. After all, artificially intelligent machines would simply do what they are told and wouldn't go on strike.

Finally, some psychological reasons have been suggested by some as to why artificial intelligence has become an area of research dominated, and particularly favoured, by male computer scientists. It has been proposed that the real goal of AI research is for men to be able to create life in the absence of their ability to conceive. This should not be dismissed lightly.

Artificial intelligence is an increasingly complex and dominant theme in much scientific work today and will undoubtedly profoundly influence the shape of the future we leave for others. If we are to see to it that this future is one in which the meeting of human needs is paramount then we will be better placed if we possess a considered knowledge of the driving forces behind AI.

Ron Roberts

What's real in artificial intelligence

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5. An algorithm is a fixed set of instructions that, when followed, will always guarantee a solution to a problem.
6. A heuristic is a set of instructions, or a stratagem which when followed might (and only might) lead to the solution of the problem for which it was devised. Programs containing heuristic procedures often use what is called means-end analysis. This technique is to continually reduce the difference between some initial (or intermediate) state and some finally desired objective. There are no compelling reasons for believing this to be the basis of human psychology.
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THE GIRL CAN'T HELP IT

Not many women make it through the UK education system and into the world of information technology (IT) on an equal footing with men. The few who do face a complex and off-putting struggle to survive in their place of work. *Polly Green* and *Chris Parry* look into the discrimination in information technology.

IT managers argue earnestly that they would employ women if only women would apply for the jobs, or present themsevles for interview with the adequate qualifications. "But they don't". This is the common excuse in an industry where women have a consistently higher drop-out rate than their male peers, as well as lower status and salaries. Behind the *excuse* is a history of discrimination.

She's always a woman to me...

When IT was starting to be recognised in this country (and even more now) it was seen as a new, young, and NEUTRAL area. That is, it was perceived as an industry without tradition, open to all-comers lacking the established prejudices associated with, for instance, engineering. It was a growth industry which was not regarded as gender-specific. So that while there were certainly mixed feelings about the potential advantages or disadvantages which computing offered, sexism was not perceived as a problematic area.

Given the prevalence of this attitude at the inception of IT it is disquieting to realise just how sex-typed many of the jobs in the industry are, and how quickly this has become accepted practice with all the authority of any age-old tradition. The issues surrounding women and the computing industry are a mircocosm of the issues which preponderate around women in science generally.

When we first started to think about women in science we were astounded to realise that there was only one woman scientist who easily sprang to mind: Marie Curie. So what happened to the intellectual and scientific community of women which has existed for every generation for at least the last 300 years? The process whereby women novelists and artists have been belittled, misrepresented and generally made invisible is becoming more well known, and that part of herstory reclaimed. However, in science, that violently male preserve, it is only now beginning to be recognised how much harder men have fought to defend their territory.

Thank heaven for little girls

The research carried out into the effects of primary, secondary and tertiary education on the abilities, aspirations and attitudes of children is well documented. It shows the complex process whereby girls are directed towards certain subjects and activities, and away from others. The importance of such things as positive role models in science to identify with; peer group pressure — especially during adolescence, even the amount of attention given to girls in the classroom (20 per cent of that given to boys in almost every situation) adds up to a process of socialization whose end result — if not its primary intention — is to push boys into scientific and technical subjects, while making girls conscious that these subjects are not for them (see graph). In more prosaic terms, the dice is firmly loaded against us.

Girls are directed towards certain subjects and activities, and away from others

This in itself would probably not be enough to deter girls from achieving in these fields, were it not also for the fact that girls and women are punished for participating in activities which are regarded by society as male domains.

What is most amazing is that women who attempt to over-ride these restrictions, in any area, are criticised first and foremost for being women. They are judged not by their performance in a particular field, but in how well or badly they adhere to the current attributes of womanliness. They pass or fail (and usually they fail), according to standards which have little — if anything — to do with their ability to work.

Once, twice, three times a lady

They are usually 'ugly' (by whose standards?); they are 'pushy' or 'aggressive' (these are positive attributes in men), or 'they allow their personal feelings to get the better of them' (this is called office politics when applied to men). They generally 'harbour a grudge against society', and sometimes they are considered sexually unfulfilled. This is a very interesting topic since the rise of the British empire has often been attributed by (male) historians to the export of serious numbers of sexually inactive young men of a Calvinist turn of mind. Men suffering from this type of inhibition rechannelled their energies into a whole field of achievements. So why not women? And if not now, when? Having identified that there is a problem, the next stage is to identify what can be done about it.

Most of the girls were in the 'office skills' courses

There is a tendency with people involved in Equal Opportunities to believe that women just need to be given the confidence to take with both hands what they are currently missing: the opportunity to get into occupations which are challenging and rewarding both financially and intellectually. But as Cynthia Cockburn says, "Are women really such weeds? I would suggest that women know very well both where we are unwelcome and what we are rejecting. We are not failing; we are on strike!" She argues that 'lack of opportunity' alone is not enough to account for the apparent failure of women to achieve work in certain fields.

A study of women who took part in the Engineering Industry Training Board Girl Scholarships scheme, found that when women were asked about the qualities needed for success, they stres-

sed self-reliance, independence and determination. And especially the ability to stand up to discouraging remarks from their male peers. They also had to be prepared to lose the society of other women. Women technologists found their women friends often resenting the fact that they had so much in common with men. So they were being discouraged both by the men and by the women who were otherwise their friends! Many sociologists stress that in the formation of values about how you live your life, peer group pressure is as strong as parental influence, certainly in adolescence, so this particular pressure on current and potential women technologists should not be under-estimated.

In her workshop at the *Women and Computing* conference, (organised by *Microsyster* in London, March 1987) Cynthia Cockburn spoke of the subtle and not-so-subtle pressures placed on girls by the boys on an ITEC (Information Technology Centre) course. Apart from the tiresome fact that most of the girls were in the 'office skills' courses, whilst most of the boys were enrolled in electronics and computing courses, she found that the boys, not content with being in the majority on the 'real' courses, persistently distracted the girls, and soon mastered the technique of sending messages to the girls' terminals when they weren't actually leaning over them and typing on their keyboards. In other words, invading their space both physically and psychologically.

These sort of problems have for some time been acknowledged to exist in just about all mixed-sexed education. In technology courses, however, it is often seen as the 'problem' of having women on the courses. When will we start accepting that the problem does not lie with the women, but with MEN and their behaviour.

'Her masters' voice'

Considering the difficulties commensurate with getting training and a start in the masculine world of IT, you might assume that having achieved your goal it would be a smooth ride all the way to a rich and early retirement, with all the attributed status that having a high powered job at the forefront of technology would entitle you to. This is seldom the case. The following comments, which men have been heard to make, illustrate their attitude towards women.

"The endless carping which you hear from women who have 'made it in a man's world', is enough to make you wonder whether or not they actually deserve a job."

"Women who complain about men opening doors for them are the worst."

"I think they're all a bunch of man-haters anyway."

"They have it a lot easier than men, and can wear almost anything they like."

"They get away with a lot more than the men do in our office, they just smile and bat their eyelids at you. It's not fair."

"They all go off and have children, living the life of Riley, while the man has to go off to the office and do the real work. It's just a game for women if you ask me."

"I won't have women managers in my office. The next thing you know they'll be taking over and telling you what to do!"

"Women just aren't interested in computers."

"Men don't bitch about so much as women."

"It's strange to have women around in the office."

The battle, in real terms, is only just beginning.

For women who do succeed, the price is a high one. It means being stronger than your male contemporaries, who on the whole have wives to look after them and society's values backing them up. It means constantly being prepared to take male abuse, and accepting male values, and, if you really want to "succeed" it means making a choice about whether or not to have children. There are also more subtle pressures which are exerted on you: the way you dress, the way you talk; being prepared to work long hours under pressure, being prepared to put your work before your personal life, having to contend with the attitudes of other women who may resent or reject you for competing with men at a level they don't; having it assumed that your work has in fact been done by someone else – a man.

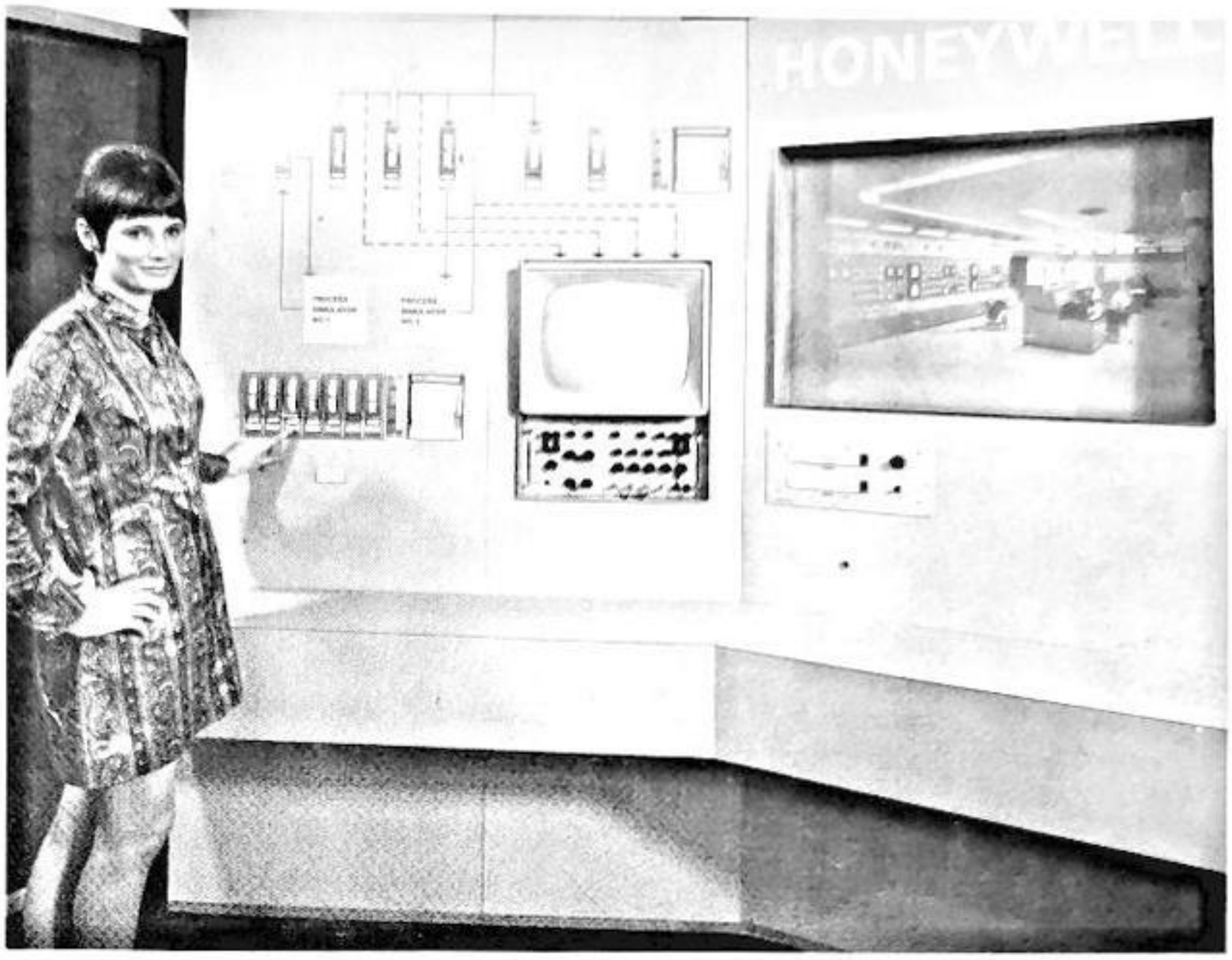
In fact a lot of these are the same pressures that women who go to work anywhere e.g. nurses, have to put up with, the difference is that instead of being praised for doing the work you do and being paid less than men for it, you are penalised for doing the work you do and paid less than men for it.

In the world of scientific discovery and research, men have consistently appropriated the research of women students and colleagues, as in the case of Rosalind Franklin, who discovered DNA. And before men deigned to let women in to the glorious fields of academe, women were barred from study and research on the grounds that their wombs (and breasts) would atrophy if so much energy were redirected to the brain. And anyway, said the male pundits, the educated ones made lousy mothers.

It is hardly surprising that the modern world of IT is steeped in sexual discrimination.

PC Green
CE Parry

References provided on request.



Women and Computing: the first step forward

MICRO WHO?

If you were asked to guess what kind of work an organisation called Microsyster did, you'd probably come up with something to do with women and computers – and you'd be right! Microsyster is a women-only organisation, which offers computer related advice, training, and resources to other groups of women in London.

Microsyster is managed collectively by its six members, of whom four are paid workers, and two are voluntary workers. In total, the group has around 45 years experience of working in the computer industry, covering consultancy, survey analysis, programming, training and education. We currently have three IBM PC/XTs, one IBM AT compatible, a high quality laser printer and fast dot matrix printer, together with a wide variety of software packages.

How we started

As Women and Computing we met for several years to talk and organise conferences before deciding to embark upon a practical project with a microcomputer. When Microsyster was set up in 1982, it was run on a voluntary basis with lots of weekend and evening data entry work. In 1984 the Greater London Council provided funding for paid workers which enabled Microsyster substantially to increase the scope and depth of its work. We now receive funding from the London Borough Grants Scheme, which pays two full-time wages (we job-share) and most of our running costs.

What we aim to do

Microsyster aims to support women in gaining the skills and knowledge necessary for them to benefit from and critically assess computer-based technology. We want to encourage women to share their knowledge of computing with others. We also aim to raise public awareness of the issues and realities of the effect of computing on women's lives.

Services and resources we offer

As well as providing practical services such as advice, work-based training and computer usage to groups of women, we also maintain handouts and information which we will send to any woman who contacts us. Because there is no other organisation quite like us, we receive many calls for help with anything which is even remotely concerned with women and computers.

We produce a quarterly newsletter, *Women and Computing*, which includes information about women and new technology groups in Britain and around the world, as well as reviews, letters, notices and opinions. We also administer the National Women and Computing Network which allows women who are interested in computing to keep in touch – we maintain a computerised cardbox of womens' details at our office, and will provide printouts of all or selected parts of it to any of the women on the network.

Conferences

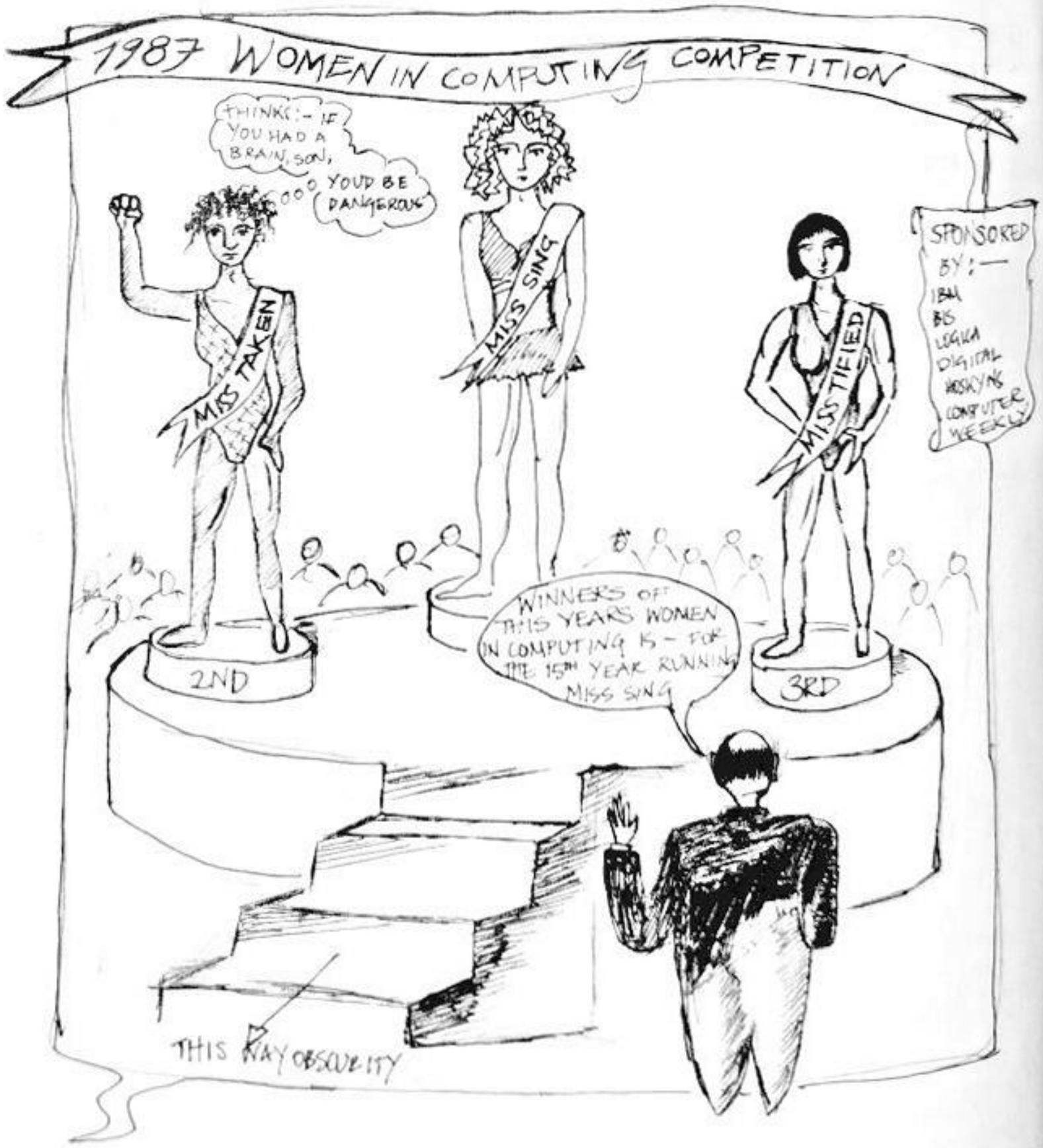
Microsyster has been organising general women and computing conferences since it began, but in the past two years we have held more specialised ones – *Teaching Computing to Women* in December 1985, and most recently *Not Over Our Heads – Women and Computers In The Office* in March. The overwhelming response of women to the conferences we have organised has confirmed that women really *are* interested in learning more about computers and their impact on womens' lives. Over 500 women with different backgrounds and experience attended our last conference, and the feedback we have had so far has been extremely positive. One woman even came all the way from Paris to be there!

Other women and new technology groups

As well as these conferences, we have also helped to set up other groups, such as *Equal Bytes* which campaigns for better computer education for women, and a support group for women working in computing in London.

We also work closely with Women in Information Technology (WITS), who are developing a database for women on British Telecom's Prestel – which is an Oracle/Ceefax-looking service you can talk back to. WITS, an entirely voluntary group of women who work in or with telecommunications, meets at Microsyster on the first Wednesday of every month at 6.30 and welcomes any interested woman.

Microsyster and WITS are jointly planning meetings on how womens' groups could use forms of electronic communications – on-line databases, page-based 'videotex' like Prestel, electronic mail and bulletin boards – now that many have microcomputers of



their own. We hope to have a one-day workshop on that technology and its possible uses, possibly in mid-July – do contact us if you're interested.

However, women can use microcomputers to communicate even without connecting them. Microsyster runs a simple but very effective service for London women's organisations to provide them with addresses of other currently active groups. We keep an up-to-date database of women's groups, the London Women's Mailing List, which is run off on sticky labels at cost price whenever a participating group needs them.

Where you can contact us

If you are a woman who is interested in computer-based technology and you would like any information on the above, please contact us at *Microsyster*, on *01-430 0655*, or write to us at *Wesley House, 4 Wild Court, off Kingsway, London WC2B 5AU*. We'd be delighted to talk to you!

HEADSTART, Women's Studies Unit

Over 300 women applied to join a women only course held over six weeks as an introduction to IT run earlier this year by the Polytechnic of North London's Women's Studies Unit.

The course's clear and limited aim appealed to many women who appreciated the opportunity of a taster before committing themselves to a long period of study in a new area. The students were largely women planning to re-enter the job market after a period of bringing up children. For most of them IT will not be a change of career but rather an additional string to an existing bow in traditional areas such as teaching or publishing. Some intend to develop their computing by further studying; others believe they now have sufficient expertise and confidence to apply for jobs which mention computing or IT. Sponsored by the MSC, *Headstart*, as the course was titled, was developed by the Women's Studies Unit to encourage more women onto the Polytechnic's Diploma in Computing – a connection course for graduates.

The under-representation of women on this course, though striking, is not unusual. There is indeed a wealth of evidence which shows girls and women being excluded from the world of computing and the job opportunities of the new technology. Under one third of examination entrants for computing at 'O' level are girls and the proportion decreases to a fifth at 'A' level and continues to decline as one proceeds up the educational ladder. Stereotyping from childhood and subject segregation in secondary schools are largely responsible for the small percentage of women who enter the computer industry which in turn perpetuates the discrimination by employing men in the 'Thinking' technical areas whilst women (predominantly young) fill secondary support roles.

Though women do in practice make excellent programmers – and the Polytechnic of North London's post-graduate diploma course awarded only two distinctions last year which both went to women – the minority who apply for the course feel typically unconfident about their ability. Last year's women formed a women's group and worked together to solve problems and write programs supporting and boosting each other through the pitfalls of the course. Interestingly this experience mirrors the evidence of girls' achievement in single sex schools where more girls choose and succeed in sciences, maths and computing when freed from the need to compete with boys. From the women's experience came the idea of a women's taster course in IT which could lead onto the diploma in computing. The main aim of the course was to develop confidence through an introduction or headstart in the relevant skills. The skills and technical knowledge were in fact secondary in importance to the confidence which the course developed. "It has taken away all my initial machine fear"..."I am no longer afraid of the jargon"..."I feel I am now in control", were typical reactions of the students.

The MSC has now given the Women's Studies Unit the go-ahead to develop an expanded version of *Headstart* with additional modules in management and business – perhaps it's back to traditional job segregation again?

For more information about Headstart or the Postgraduate Diploma in Computing, contact Women's Studies Unit, Centre of Continuing Education and Community Access, Polytechnic of North London 01-607 2789.

Alison Hearst

CROPS AND ROBBERS

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SOCIALIST SCIENCE FORUM

Inaugural meeting: Wednesday 23 September 1987

David Murray : **Is *Science Social Relations?***

7.30 pm in the Library, Conway Hall, Red Lion Square (nearest tube Holborn)

All welcome

For further information contact: Hyman Frankel, c/o SSRS, 25 Horsell Road, London N5 1XL Tel: 01-607 9615.

OFFICE POLITICS

In recent years many trade unions have successfully negotiated New Technology Agreements to cover the introduction of VDUs into offices. *Hazel Downing* points out that while these health and safety agreements are necessary, they do not go far enough. What is needed is a willingness to challenge the imposition of a technology which has as its rationale the control of the labour force.

For most of the past decade, the question of the impact of new' technology in the office has been largely focussed on the issue of VDU hazards and the need to secure agreements to control these hazards. More recently, there has been a growing awareness among white collar unions that existing new technology agreements have not been completely successful in combating these hazards and that what is needed is a thorough remodelling of the jobs of VDU operators; in other words, we need to negotiate good job design as well as good workstation design.

The use of the adjective 'new', while no longer strictly appropriate, permits VDU-related technology to be treated simply as a piece of technology, conceptually and organisationally different from anything which preceeded it. The emphasis on technology as technology forms the basis of many New Technology Agreements won by trade unions, particularly during the early 1980s, and manifests itself in the fact that many of these agreements deal overwhelmingly with ergonomics and health and safety, but neglect the raison d'etre of the technology and the intention behind its introduction. For instance, a survey of British trade unions' responses to new technology conducted in 1980 revealed that none of the unions involved in the survey questioned the nature of the technology and implicity accepted its existence and thus its neutrality.[1]

This acceptance of the neutrality of technology is all the more surprising when juxtaposed with the views of Franco de Benedetti, the Managing Director of Olivetti which manufactures office equipment. Addressing a *Financial Times* New Technology Conference in 1979, de Benedetti emphasised the importance of applying Taylorist techniques (i.e. the breaking-down of a specific task into its component parts) of scientific management to the office. Despite many attempts to achieve this, the proponents of Taylorism in the office were never fully successful. Office automation, as de Benedetti and other manufacturers recognise, presents employers with an opportunity to succeed where others have failed. As he told the conference:

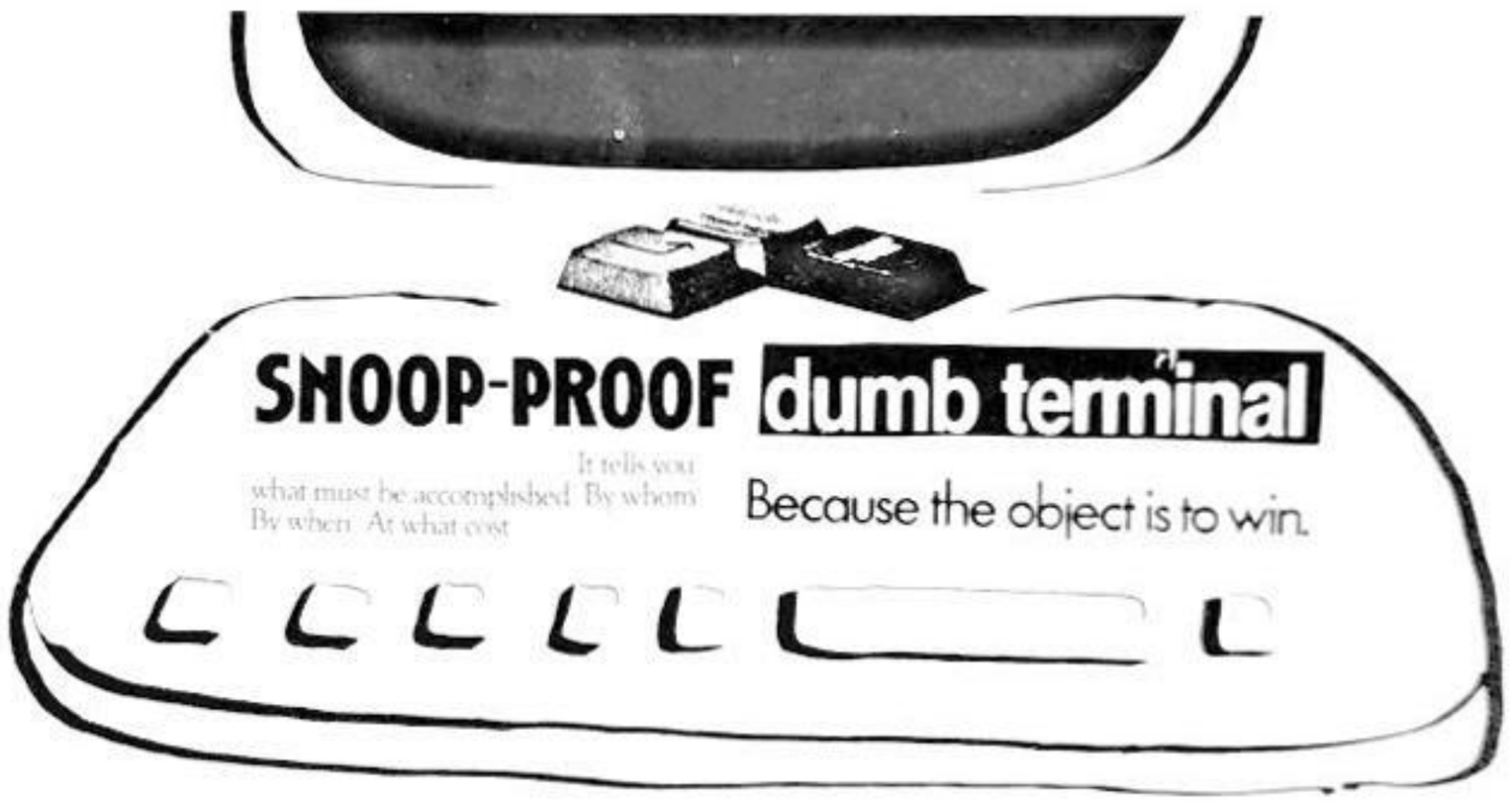
> Data processing...is a continuation of a story which began with the industrial revolution, which incorporates the development of abstract terminologies within the development of technologies. Information technology is basically a technology of coordination and control of the labour force, the white collar workers, which taylorian organization does not cover.[2]

Though now eight years old, this quote is still relevant. Indeed, in the intervening period, I have found no statement from an office equipment manufacturer or from an employee which so succinctly sums up the rationale behind this or any other technological innovation into the labour process. What is clear from de Benedetti's statement is that information technology is all pervasive not just because it happens to be there, but because it appears to succeed in enabling managements to extend their control over the work process in a way that differs only in range and extent from previous forms of office work organisation. As de Benedetti says, "it is a continuation of a story which began with the industrial revolution". The demand for job design challenges the process of management control.

The battle over control, over the timing and pacing of work, over demarcation and deskilling is a continuous one. The introduction of a new piece of technology which profoundly affects the way work is organised acts as a constant reminder that struggles at work are not and indeed cannot be limited to a struggle over wages.

The real effects of office automation are new health and safety problems, deskilling, a remorseless increase in boring and repetitive work and ultimate control of workers through machine monitoring of output and performance.

The vulnerability of many New Technology Agreements lies in the fact that they have concentrated on eliminating the very immediate and serious health problmes experienced by people who work with VDUs, but fall short in dealing with the other aspects. As a result, we now have many thousands of workers covered by agreements which itemise



Aisha Kandisha

in precise detail the most ergonomically sound specifications for the equipment, the workstation and the environment. We have won the battle over the refresh rate of VDUs, over the size and matrix of the characters, over the lighting, siting and the colour of the office walls. More recently, we have won agreements on the provision of anti-glare screens, and for some, the right to ten-minute breaks after every hour of VDU-working. But all this, as now becomes apparent, has not been enough.

Aisha Kendisha

There have been enough investigations, including my own research, which demonstrate quite clearly that even during what might be called the 'pre-VDU period', clerical and secretarial work, for the majority of workers engaged in it, was boring and repetitive. When those workers become VDU operators they discover that their work becomes more boring, more repetitive, more intense and invariably more stressful. They find that they are no longer controlled by human supervisors, but by the pace and demands of the machine; and indeed, many will find that not only is their performance measured and evaluated, but the time they spend off the machine, for meals and toilet breaks, will also be logged and used for disciplinary purposes.

Of course, we must acknowledge that operators who work for seven hours a day on a VDU will experience fewer health problems if covered by an agreement detailing ergonomic standards for the equipment and accommodation than their counterparts who are not covered. (And it is a sad fact that a significant proportion of officer workers are not unionised and therefore only likely to have anything better than the minimum if they are fortunate enough to have an employer with a conscience.) However, as a recent study shows, even with a good new technology agreement, workers still suffer many physical and stress-related problems resulting from VDU work.

The health survey of VDU operators working for the London Borough of Newham[3] shows that the health of a large number of VDU workers had deteriorated since they began working on the equipment. The researchers found that despite important clauses in the agreement giving breaks after 50 minutes continous VDU working and limiting VDU work to a maximum of four hours a day, over one fifth of the workers were working at their screens for more than five hours a day and over three quarters were working more than 50 minutes at a stretch. They also found that more than 80% reported visual problems, such as aching, watering or burning eyes, blurring vision, difficulties in focussing and grittiness in the eye. About half reported muscular problems through uncomfortable work posture and the incidence of what the researchers termed 'psycho-social' problems, such as confusion, depression and irritability, was much higher among VDU users than non-VDU users, though worse for heavy users (i.e. those who had worked for more than a year and for more than three hours a day on the VDU).

Their work invariably becomes more boring, more repetitive, more intense and invariably more stressful

There are two main reasons why these problems persist: firstly, because the technology was introduced into an office environment designed for equipment now obsolete and, secondly, because the technology was literally grafted onto existing jobs and work practices "with no consideration of the new needs consequent upon introducing new technology".[4]

An important question posed by this study is why, even though the agreement provides for both breaks and time limits on VDU operation, the operators continue to suffer from the most common VDU complaints, which is what the time limit is designed to eliminate. Time and again the researchers were told that, given the tasks the employees were expected to carry out, it was not possible to adhere to the breaks laid down in the agreement. As one of the respondents remarked: "If it is impossible to carry out the job within the guidelines that have been laid down, then people will do what they have to do". They will carry on working beyond the 50 minute/four hour limit until the job is done. Office workers are very often guided by their own conscientiousness, rather than their health needs, but their conscientiousness is dependent on employer expectations.

Information technology is co-ordination and control of the labour force

Two of the recommendations of the report are the need for proper consultation with workers when drawing up technology agreements and the need for job (re)design. They point out that:

- The conditions for improving health and safety involves in the broadest sense job redesign based on an awareness of how health and safety is the outcome of the complex interrelationship between the technology, how it is used, the individual employee, the office environment and the job itself.[5]

In other words the elimination of the huge range of health problems associated with VDU work does not just depend on

ergonomically correct furniture or the provision of anti-glare screens, but on a complete overhaul of the jobs imposed on VDU workers. No amount of ergonomic tinkering will resolve the problems suffered by workers who are engaged in a single repetitive task. Job redesign is a prerequisite for the elimination of stress and for ensuring job satisifaction.

The report recommends that jobs be redesigned so that breaks occur 'naturally' every 50 minutes, that no employee be required to perform only a single task or maintain a single body posture, and that no one works with a VDU for more than 50% of the working day. The latter is an important demand and a shift away from the agreed four hour limit, a move which is necessary if we are to avoid the situation where employers use this as an 'ergonomic' justification for introducing more part-time working.

There are clearly a number of problems posed by the demand for job design — the main one being that of securing management agreement. While employers may readily agree to certain ergonomic specifications — in any case most VDUs are built according to these agreed standards — they may not so readily agree to a work pattern which does not involve constant use of expensive equipment. They will almost certainly argue that with the use of VDUs so widespread, there just isn't any non-VDU work to do. The real problem, however, lies with the fact that although jobs could be redesigned, the demand for job design undermines the very reason why so many employers are so keen to introduce VDUs — to increase productivity and, as de Benetti says, to increase coordination and control of the white collar labour force.

Hazel Downing

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CINEMA OF WOMEN

Cinema of Women (COW) has come a long way since the first struggling but optimistic days of 1979. Founded by a small group of women film-makers and film school students, COW emerged in response to a very real and practical need for the organised distribution of film material by and relating to women. The influence of feminism during the '70s meant both that more women were producing films, and that there was an ever-increasing demand for material dealing with all aspects of women's lives.

The importance of having a specialised distributor with an inside knowledge of the needs and potential of that market has been overwhelmingly demonstrated by the continuing growth and success of Cinema of Women. Beginning with a tiny grant of £1,000 from Tower Hamlets Council, and a handful of short films donated by film-makers covering subjects such as 'romantic love', violence against women, prostitution, and sexism in schools, COW operated at first from a tiny back room in East London — the home of one of the collective members.

It was run on a part-time basis by enthusiasm and commitment and very little else besides the rare excitement of creating from scratch a new, challenging and vital force within British film culture. A force acknowledged by the British Film Institute as early as 1981, by the presentation of their prestigious Special Award for Services to Film.

Now, eight years and three moves later, COW's busy offices in Clerkenwell workshops is the base for the national distribution of over 100 titles, from Britain and across the world, all directed by women, and reflecting the enormous diversity of women's work in film, video and television. We now have four paid workers, and are in receipt of funding from the BFI, although the majority of our income is still self-generated.

A major area of expansion has been into video sales and distribution, keeping pace with the changing nature of independent film and video production in the '80s, and the new pattern of non-theatrical use. Community and education requirements are now almost exclusively for video rather than film, and COW's flexible structure enables it to respond rapidly to changing demand. Through membership of the Video Distribution Forum, COW takes an active part in shaping the future of independent video use and supply.

In fact, Cinema of Women is one of the very few companies handling all areas of film and video distribution. We supply and give advice to film societies and educational and community organisations. We acquire and promote international features and shorts for cinemas, and negotiate television sales of fiction, documentary and animation. Our increasing presence at international film festivals reflects the continuing optimism of this unique organisation.

The collective has changed since the early days — women from COW have gone on to work in various areas of film and television, as commissioning editors, producers, directors, technicians, journalists and cinema programmers — but the enthusiasm, the determination, and above all, the willingness to take risks that has always made Cinema of Women such a force to be reckoned with, are all as strong as ever.

The new Cinema of Women catalogue is now available. As well as feature films, such as *Working Girls* and *Anne Devlin*, topics covered include: Health, Images of Women, Imperialism, Lesbians, Peace, Social Institutions, Violence Against Women, Work and Young Women. For a copy of the catalogue, or to book any film or video, contact *Cinema of Women, 31 Clerkenwell Close, London EC1R OAT. Tel: 01-251 4978.*

Leila and the Wolves, dir. Heiny Srour

TAKING LIBERTIES

The Data Protection Act is a piece of legislation brought in by the Conservative government. In this article *Christine Parry* and *Polly Green* examine the issues around data protection. They centre on the notion of democracy; the rights of individuals (privacy); and the rights of governments or business (secrecy). How viable is a democracy in which the odds are stacked against the individual?

"**democracy** *noun* 1. government of the people or their elected representatives. 2. control of any organisation by its members: industrial democracy. 3. a political or social unit governed ultimately by all its members. 4. the practice or spirit of social equality. 5. the common people especially as a political force."

In this day and age when a lot of talk about democracy is flowing from the mouths of politicians, it is useful to go back to dictionary definitions — just to see where we may be being led astray. Taking the name of democracy in vain is a ruse which has been used by all our political parties. What is far more pernicious, and is representative of all people in power, is the desire for secrecy. This does not only apply to the government (although they are the leaders of the pack in this area) but also to industry.

There are some particularly ludicrous examples of this attitude. In 1958, British Rail kept secret the findings of a commission which had studied the effects of dumping the contents of train lavatories onto the tracks. British Rail had announced that the commission's findings were that there was absolutely no threat to public health. But they refused to publish or disclose the supporting documents.

When questioned about the Official Secrets Act, MP's have traditionally dismissed the issues by suggesting that it exists in the interests of 'national security', thereby pointing at you the finger of patriotism. This is a standard technique. In fact the question is rarely one of spies or national defence, but of government embarrassment. The governments of the day have invariably seen government embarrassment as a security issue. The fact that other countries can and often do know about such things has been irrelevant. It has been a question of how much the British public know. This is because it is only (military coup notwithstanding) the British public who can vote out one set of politicians and have them replaced by another set of politicians.

How is this allowed to happen?

Since 1898, the date of the first Official Secrects Act, secrecy has been a key component in the workings of government. The assumption was then, as it is now, that people did not really need to know the way in which decisions were made because they weren't really competent to judge. This is what Duncan Campbell refers to as the 'Nanny knows best' attitude. It is also an attitude enshrined in education and child-rearing: obedience without question; subservience for its own sake. Alice Miller[1] propounded a theory in relation to this "poisonous pedagogy" which she says can largely account for Hitler's policy and his ability to bring most of middle-class Germany to support him.

If ignorance is bliss we should all be in a state of ecstacy

The point is that in a democracy (which we weren't in 1889), the government should exist to do as we wish. Not to absolve us from the responsibility of decisions about the way our country is run, but to *reinforce* that responsibility.

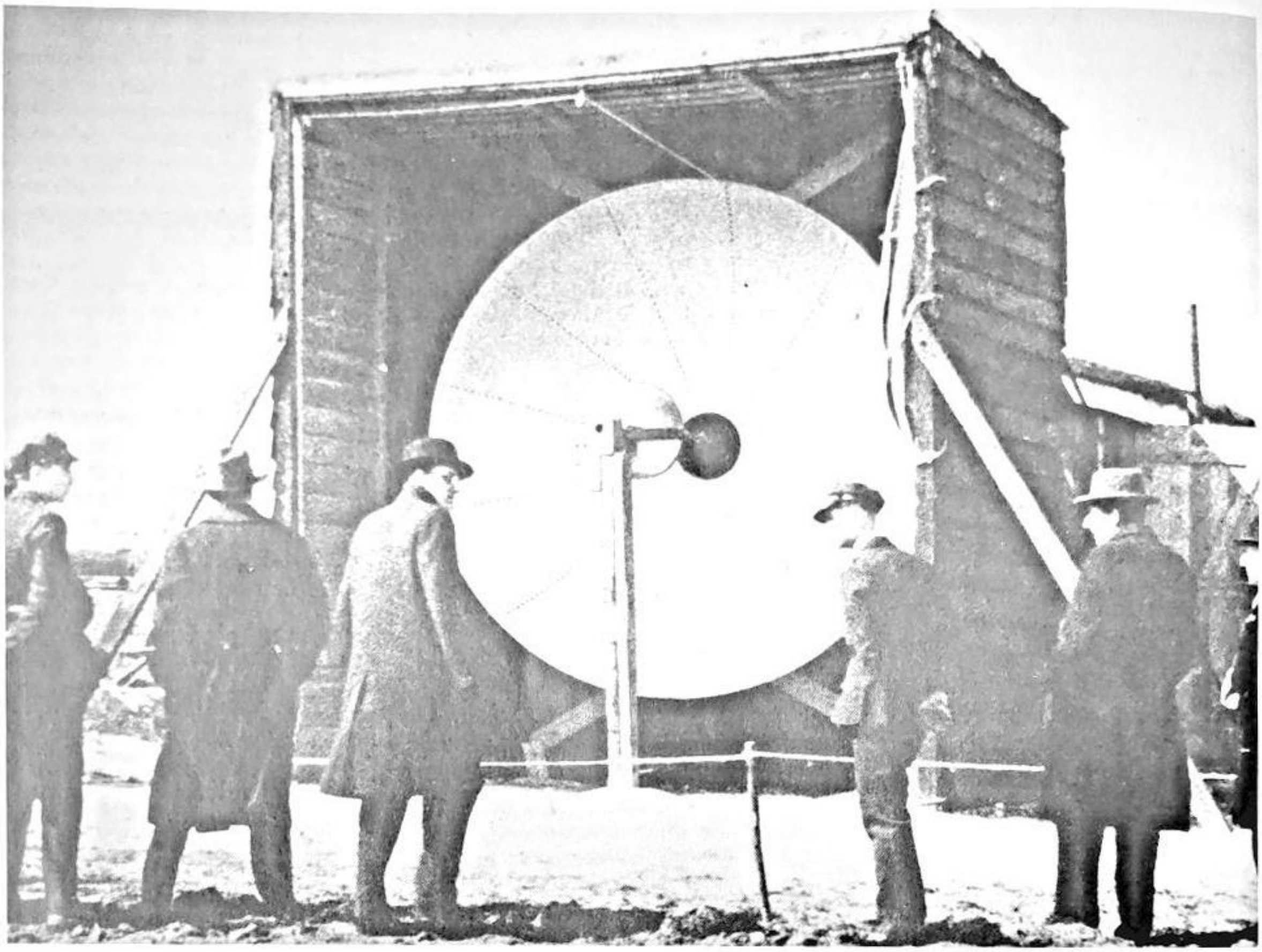
This brings us to the British Disease. For Conservatives, the British disease means strikes or even just union activity. This attitude is based, for those who advocate it, on the fact that they — or their friends — are more financially hurt by individual action than they like to be. And of course it worries them. Alternatively, others like Richard Crossman[2], held that "the real British disease is secrecy". Those remarkably divergent views both derive from thinking about the same subject: running the country.

Another characteristic of the freedom of information debate is that secrecy and privacy are represented as the same thing. An individual's right to privacy is a very different thing from that of a government or company. In British law, a company is regarded in almost the same light as an individual, and assumed to have the same right to confidentiality. This is very dubious. I do not suppose for one minute that companies have feelings. The law however seems to be entirely of this opinion and respects those feelings even when they are operating against those of individuals.

The real British disease is secrecy

The secrecy which surrounds the actions, decisions and reports of our government and our industries is not acceptable in many other countries. America, Sweden, Canada and Australia all have Freedom of Information Acts which actively require in most cases that information be made public. In fact a lot of information which over here is classified can, for the price of a stamp, be obtained from America. This only serves to make us look ridiculous. If information about the nature of food additives, or the state of health and safety in our factories is available to Americans when it isn't available to us, then we are certainly being made the victims of a very shabby conspiracy.

Issues relating to secrecy and privacy become far more profound when considered in relation to the trend towards computerisation. Computers are here to stay and in many respects they are necessary. But they are not infallible, nor are they neutral analysers of information. As more and more information, about health, social security, tax etc., is put on computer, so there is a greater scope for infringement of individual



The earliest days of 'listening in'

privacy and the need for data protection legislation becomes paramount.

The Data Protection Act

Britain's own Data Protection Act finally takes full effect from November this year, more than 20 years since the first Private Member's Bill on the subject. The result of some belated altruistic concern for the rights of individuals? No chance. This deeply flawed piece of legislation is the minimum the government could get away with and still satisfy the European Convention on Automatic Data Processing which sets out some basic principles to be observed regarding the handling of data. This is of considerable importance, for countries without such legislation will be excluded from data trade by those countries with appropriate legislation.

So, thanks to the interests of business rather than civil liberties groups, the Data Protection Act is now in being. Broadly, the Act covers the eight principles set out in the Convention. As Duncan Campbell says, "the Data Protection Act's utility was actually that it knocked the idea that the individual should have some rights against the bureaucracy into a very unwilling establishment".

Violations will only be detected by chance

As it stands though, the Act is riddled with loopholes very kindly pointed out by various groups including the National Computer Centre (NCC), in the form of advice on how to "mitigate the effects of the legislation". In a manual entitled 'Personal Data Protection' they suggest various ways of evading the Act, including keeping records in a card index to remain completely exempt from the Act. Or registering different types of data separately thereby discouraging people requesting access because they would have to pay separate fees for each request.

This type of attitude from the NCC of all people is particularly deplorable, but the point really is that the Act is full of holes. Here are just a few:

- Manual records, which tend anyway to contain the most potentially damaging data are not even covered.
- Government departments cannot be prosecuted under the Act.
- There's no requirement on the Registrar to supervise compliance after registration, so most violations will only be detected by chance.
- You have no right to have inaccurate data corrected or removed: it merely has to be noted against your record that you dispute it!
- Data held for the prevention or detection of crime is exempt from disclosure. And would you believe it, there's nothing to stop anyone claiming this exemption, not just the police.
- Databanks which concern 'national security' don't even have to register their existence.

It's not just the weakness of the legislation itself. The will and means to administer just aren't there. The registrar Eric Howe has less than 50 staff to deal with an estimated 300,000-400,000 registrations. And the charge to be made to people who wish to exercise their rights has yet to be announced, but at an expected rate of £5 it would be deeply punitive and would render the principle of conferring rights on individuals meaningless.

The Act will prove to be unworkable

Indeed many people believe that the Act will prove to be unworkable. The problem is that its very weakness lessens its chance of being strengthened. Duncan Campbell points out that "to improve the legislation depends on cases being brought into the public domain which arouse outrage. You're in a Catch-22. If the legislation were stroger, it would almost certainly produce a succession of such cases which would be dramatic and powerful evidence both of the value of such an Act, and the need to make it work. The fact is, it's so weak that the chances of such weaknesses being exposed are reduced". So how does this bode for the future?

People feel threatened and powerless

Advances in computer technology have been and continue to be phenomenal. Hardware and mass-storage devices are now ridiculously cheap, and if software, in particular artificial intelligence applications such as pattern recognition, natural language understanding, expert systems and other heuristic systems[3] are still in their infancy, it is reasonable to expect that they too will advance exponentially. More data than ever before is being held on every individual in the country, and if our apprehensions of Big Brother have always been somewhat in advance of what was technically possible, people justifiably feel threatened and powerless when faced with this invisible snowball of information, precisely because it is hidden from their view.

The situation of the average individual in Britain in 1987 is this: You have no right to examine secret files kept on you by the Inland Revenue; by the NHS; by the Department of Education; by the Census; or by the Police. Moreover, all these institutions can exchange information about you, and can put into your file any hearsay, rumour, or subjective assessment they see fit without any fear of reprisal. The government does not have to tell you anything except at its own discretion. You do not even have the right to know how the government reaches its decisions. You are to be kept in complete ignorance whilst others, including other countries that are not even our allies will have more knowledge about the state of our security and even the food we eat, than we ourselves. If ignorance is bliss, we should all be in a state of ecstacy!

The question is rarely one of spies or national defence

What can be done about this?

Whilst you cannot create an ideal society in which people are totally protected from infringements of liberty, what you can do is create legal and bureaucratic obstacles to the use of computers that is inimical to liberty. The most powerful way of dealing with the problem is to demand full and compulsory disclosure with very severe penalties for failure to disclose. Once people have the legal right to see everything that is going on that affects them, a large part of the problem goes away. With the onus on data users to regularly supply people with full details of what information they hold and who they have transferred it to, the dangerous power of information is diffused and distributed back to ordinary people.

Duncan Campbell believes the fundamental issue is "about the balance of power, about democracy, about control over your own life. The right to do so, the power to do so and the means to do so." Whilst the Data Protection Act is a very small step in the right direction, Britain clearly has a long way to go.

We would like to thank Duncan Campbell for his help and ideas, and for letting us interview him under the most trying of circumstances. Any inaccuracies in this article are entirely our own.

References

1 Alice Miller, *For Your Own Good*, Virago, 1987.

2 J.Michael, *The Politics of Secrecy*, NCCL.

3 A heuristic system is a 'problem-solving' system which progresses through trial-and-error.

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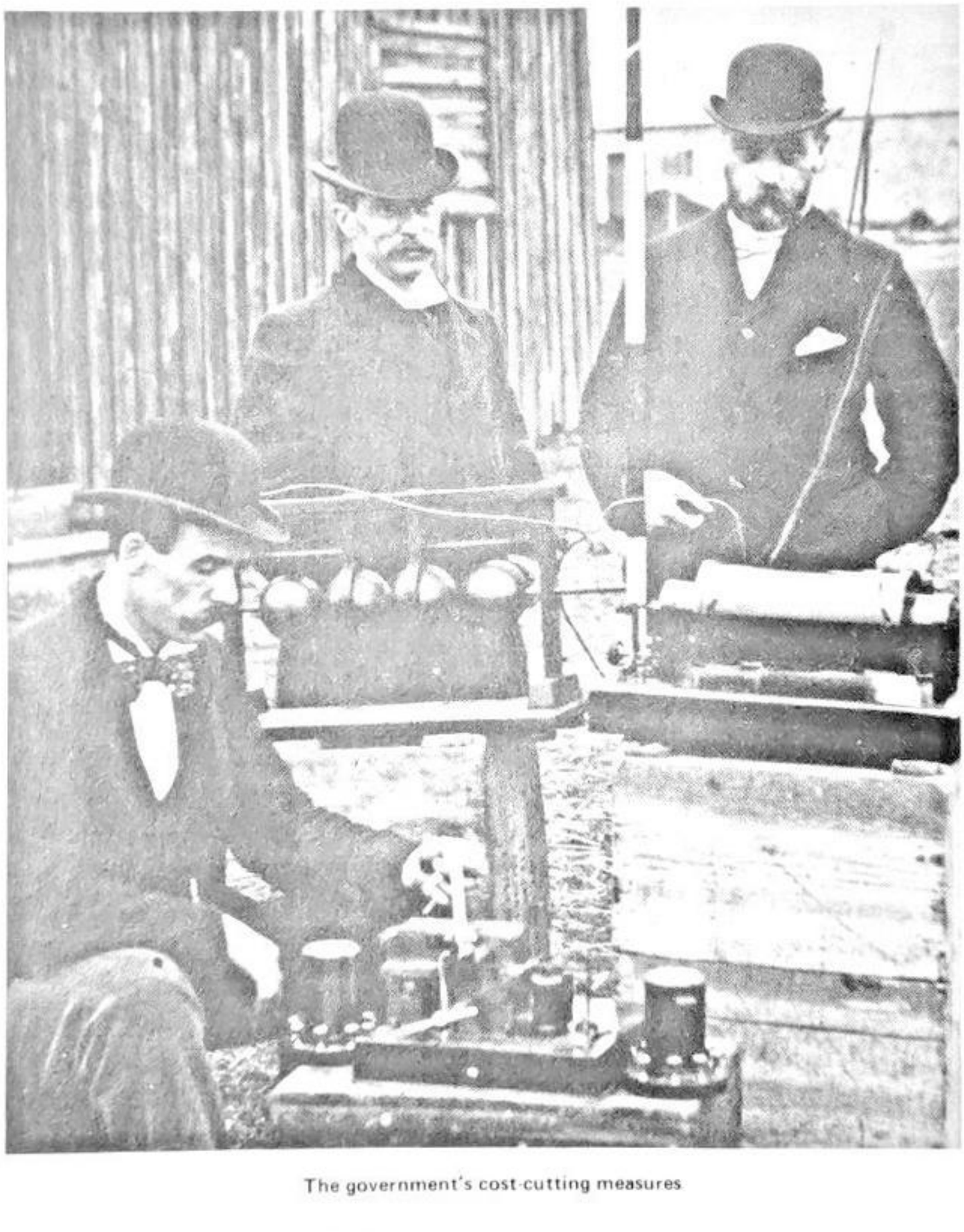
TECHNOLOGICAL BENEFITS

The government is currently planning the massive task of computerising the DHSS, but the Society of Civil and Public Servants does not believe they will improve the service for either claimants or staff. *Duncan Grant* describes their Alternative Operational Strategy.



The government's cost-cutting measures

The Society of Civil and Public Servants (SCPS) has recently produced a document in reaction to the government's plans for the computerisation of the DHSS. The Alternative Operational Strategy argues that the government is using the introduction of new technology as a cost cutting exercise. For a system which is already understaffed, and in some areas barely able to cope, further staff reductions are planned.

SCPS further argue that the government's plans will lead to the system becoming more impersonal, while both staff and claimants are in favour of an increase in face to face contact.

SCPS is not against computerisation. They recognise that many repetitive clerical tasks, currently done manually in local DHSS offices, could far more easily be done by computer. But the extra resources released by the implementation of computerisation should be combined with an increase in staffing levels to improve the service for claimants; eliminate the backlog of work which is constantly accumulating; improve the job satisfaction of staff and make sure that computerised records containing personal information on claimants do not fall into the wrong hands.

SCPS believe that the government must change course now before irreversible damage is done. The government's plans for the computerisation of the DHSS system is the largest computer project ever undertaken in Europe and will cover a system which currently involves 40,000 staff handling five million claims every year. It is a 20 year project involving an initial investment of some £700 million. The Union's documents points out that mistakes made now will be impossible, or extremely difficult and expensive, to rectify. Unless plans are made now to use the increased resources released by the introduction of new technology to improve the service, a unique opportunity will be lost.

Declining Standards

The current situation in many local DHSS offices is often chaotic. Unemployment has increased dramatically over the last eight years, coupled with an increase in the number of people living in conditions of poverty and on low wages. There has been no corresponding increase in the number of staff to deal with this situation however; in May 1979 there were 100 claimants for each member of staff, this figure has risen steadily to 121 in 1983, 123 in 1985 and had reached 125 by May 1986.

The staff shortage and backlog of work has led to increased pressure and stress for staff and virtual breakdown in communication between staff and claimants. The increased hostility and frustration felt by claimants has led to numerous incidents of physical violence on members of staff. Staff have responded by developing short cuts in their work, specialist sections have been closed and home visits have been abandoned. This background of increas-

The government's plans for the computerisation of the DHSS system is the largest computer project ever undertaken in Europe and will cover a system which currently involves 40,000 staff handling five million claims every year.

ing staff pressures and bad working conditions must be taken into account in any analysis of the Department's plans.

This current appalling situation in local DHSS offices is not the only problem. The Department is embarking on two huge projects almost simultaneously; not only are they introducing the largest computer system in Europe, they are also planning to completely overhaul the benefit system itself. Staff will have to get to know a completely new benefit system and a new way of administering it.

A Centralised DHSS?

The main changes to the benefit system involved in the 1986 Fowler Social Security Act are:

- fundamental changes in means-tested benefit schemes
- further reduction in non-means-tested benefits
- cuts in state earnings-related pensions.

The Department's computerisation strategy revolves around the development of a central index at Newcastle which is accessed by a series of regional computers linked to microcomputers in the local offices. The new structure involves the establishment of an extra level of area computers because of the strain which was envisaged if everything was held centrally. It probably did not escape the government's attention that this arrangement would also reduce the impact of industrial action.

The stated aims of the Department in the Operational Strategy are the provision of a better service to the public; more efficient use of departmental resources, and provision of better conditions for staff. SCPS do not believe that the Department's proposals will lead to any of these objectives being reached; the computerisation strategy is merely a way of cutting costs and that throughout their document 'efficiency' simply means 'fewer jobs'.

If the strategy is implemented as it now stands the amount of contact between the staff and the public would be further reduced. SCPS does not regard the prospect of staff keying in claimants' details at a computer screen or answering claims by telephone, as an improvement in the service for anyone. Another major implication is the cutting of large numbers of jobs, as many as 25,000 in some estimates. The Union is calling on the government to reverse this, and has produced a jobs plan calling for an increase in staffing levels so that there can be a genuine improvement in the service. The cutting of staff numbers at a time when computers are being introduced will only lead to a deterioration of the service, and the remaining staff will have to learn new procedures while getting on with their routine work and trying to find time to fit in training.

Information Abuse

Because of the large amount of personal information which will be held on the computer system the SCPS is extremely worried about the potential abuse of civil liberties. The capacity to create a network of the major computer systems run by the Police, the Inland Revenue, local authorities and the DHSS clearly exists. There is already an informal relationship between the police and the DHSS in the investigation of fraud cases; it would be much easier to cement this relationship when the information is stored on a central computer.

The capacity to create a network of the major computer systems run by the Police, the Inland Revenue, local authorities and the DHSS clearly exists.

There are two types of information collected in a DHSS interview. First there is the straightforward factual information on a claimant, and then there is the type of information which is an **opinion** or an **impression** of the interviewing officer. How this second type of information is used is very much of concern to the Union. And as so much less space is needed to store data when the system is computerised, the potential to keep information for much longer exists.

Alternative Strategy

SCPS have laid out clearly what improvements they would like to see from the extra resources freed by new technology. Efficiency is viewed by the Union not as a crude staff/claim ratio but a genuine measurement of how the service is working. The SCPS detail how claims can be dealt with more quickly, the relationship between staff and claimants improved and surroundings modernised. They believe that the service should 'go to the people' with the restoration of home visiting and the encouragement of increased benefit take-up. There should be increased numbers of Special Case Officers recruited to help claimants with special problems. Finally, they believe that the anomaly which leaves the Social Security system as the one public service without a watchdog should be rectified, with the establishment of a democratically accountable body along the lines of the Community Health Councils which monitor the NHS.

The new structure involves the establishment of an extra level of area computers because of the strain which was envisaged if everything was held centrally. It probably did not escape the government's attention that this arrangement would also reduce the impact of industrial action.

The benefits to staff of the Union's alternative strategy are also widespread. SCPS would press for increased pay, a shorter working week, increases in annual leave, better childcare and special leave facilities and paternity leave. It is clear that if the system is improved and the relationship between claimants and staff is restored then job satisfaction will increase.

Timing is crucial. The government must change course now while the project is at the crossroads, otherwise the opportunity to make genuine improvements in all areas of the Social Security System will be lost.

Duncan Grant

Duncan Grant works for the Labour Research Department, an independent trade union research organisation which derives its funding from the sale of publications and the affiliation of trade unions locally and nationally and of individuals. For further information contact *Labour Research Department, 78 Blackfriars Road, London SE1 8HF. Tel: 01-928 3649.*

A LA MODEM

Big business is used to having high-tech communications systems completely in its clutches. But a small UK project is helping radical groups make use of the new information technology. *Soft Solution* explains how a series of high pitched squeaks can make campaigning easier.

Until recently, the application of modern computer communications and information technology has been mainly restricted to the large commercial institutions, government agencies and news services. A quick look at the nature of most commercial computerised information services, or databases, will illustrate the sort of users catered for. Up to the minute information on stock and commodity prices, bankruptcies and commercial law is instantly available for those who can afford to pay.

However, access to electronic communications technology need not be restricted to such organisations. Microcomputers are now becoming commonplace amongst organisations more interested in human welfare than making vast profits — opening the door to the use of electronic communications for other purposes. The costs are no longer prohibitive — the additional equipment and software can be assembled for around £200 and the monthly costs are similar to those of a telephone.

The Poptel project was initiated with the aim of developing the use of this technology in what could loosely be called the noncommercial, campaigning and co-operative fields. Initially, the project is developing an electronic mail network to provide fast and cheap communications, both inside the UK and internationally, linking a wide variety of organisations and individuals. Organisations working in the fields of human rights, third world development, international labour, co-operative development, disarmament and many others are currently using the system.

How does electronic mail work, and how does it help? The principle is simple. You attach a 'modem' to your computer, this is a device which allows computers to communicate with each other through the telephone system by a code of high-pitched squeaks. Then you simply dial the number of the modem of the computer on which the electronic mail, or 'email', system is running, or 'hosted', and communicate with the email system through your own computer. On email you have your own private 'mailbox' from which you can send and receive messages. Once you are 'talking' to the email system, you can send messages (usually prepared beforehand on a word processor) to other mailboxes on the same system and read those that have been sent to you. Received messages can be stored on a disk in your own computer, or 'downloaded', allowing you to deal with them at leisure without the costs of being connected to the host machine.

The information and expertise that many organisations have can be turned into a major resource for use by others working in the same or related fields

Once sent, the message is immediately available to the recipient, wherever they are. As soon as they dial into their own mailbox, they will be told that they have received a message. It is even possible to ask the computer to ring them up and tell them that there is a message waiting for them, if the message is urgent!

You are not restricted to talking to people on the same host computer. The Geonet system, the host computer which the Poptel project uses, has communications with other computers in Europe and North America and links to other electronic mail systems such as BT Gold, and others will shortly be available.

As well as your personal mailbox, there are also bulletin boards available, where messages of public interest can be posted. There are dozens currently available, for messages on a wide variety of specific topics, and the range is quickly expanding. These can provide a powerful tool for disseminating information to a wider audience.

Additional facilities include the ability to send and receive telexes, access a variety of commercial databases, and send messages to facsimile machines.

An electronic mail network to provide fast and cheap communications both inside the UK and internationally

The benefits of rapid communications and the availability of information and the consequent savings in time and money are obviously attractive, but what are the problems? The main drawback is the obvious one — who else is there in the network that I would want to talk to?

At the current, relatively early stage of developing the network, most users have been coming on as groups who already have an established need for communications. For example, the Interdoc network of international documentation centres are using the system to connect users in South, North and Central America, South-East Asia, Australasia and Europe. London Co-operative Training are using the system to implement their information exchange between (initially) London-based co-operatives and co-operative development agencies. Members of Cruisewatch are using the system to communicate both amongst themselves and with others working on environmental issues in the UK and abroad. The Community Computing Network, composed of agencies and individuals, is involved in developing access to computers mainly amongst community-based organisations. They are also using the Geonet system. In addition to these, and the wide variety of organisations (and individuals) who are part of the Poptel network, the Green and Unet (a network of organisations working with the unemployed) networks also use the Geonet email system.

Other, more surprising uses of this technology also exist. One co-operative in London is actively considering using the Poptel email network to avoid the costs of maintaining an office. By exchanging documents electronically, the delays become minimal and the idea becomes more feasible. The London Food Commission — as well as using Poptel for information dispersal — already find it convenient to transfer documents prepared on word processors at home to the office via Poptel.

Marconi making waves

One of the users of the system, Article 19, a human rights organisation, used the network to send electronic messages and telexes to governments and non-governmental organisations, to focus attention on the plight of one of their directors in South Africa. He had been arrested for his political activities. As a result of this electronic campaign a number of EEC countries immediately made a formal complaint to the South African Government.

The next stage in the development of the project will be to put people's information into databases that are publicly available. The information and expertise that many organisations have, and would like to be made more readily accessible, can be turned into a major resource for use by others working in the same or related fields. For example, the many directories of different organisations, contact addresses, etc. held in such a database would allow you to find, say, all organisations interested in funding particular types of projects, within a few minutes, instead of hours or days of research. The sorts of information that can be made available are almost limitless.

The rapid growth in the number of electronic mail users makes the communications possibilities in the non-commercial sector very exciting. The importance of physical location in information sharing and communications is radically reduced allowing new forms of co-operation to develop both within and beyond national boundaries. Quick access to information ceases to become the preserve of large commercial institutions and becomes an everyday part of the work of organisations working in noncommercial fields.

The Poptel project is run by *Soft Solution*, a workers' co-operative. If you would like more information about Poptel, our contact address is: *Poptel, 25 Downham Road, London, N1 5AA — Tel: 01-249 2948.* Our Geonet mailbox is GEO2: POPTEL—ADMIN.

REVIEWS

Machinery of Dominance

Cynthia Cockburn
Pluto Press, 1986, £5.95

Machinery of Dominance is Cynthia Cockburn's description for technology, by which she means that men use technology to maintain their power position in society. She does not mince words, 'The technical competence that men as a sex possess and women as a sex lack is an extension of the physical domination of women by men'. From the print technology which she examined in *Brothers,* to the computer-based technologies she examines in this book, she shows how this applies regardless of the technology under discussion. Whose knowledge and whose intelligence will be encoded in the future information technologies of knowledge engineering and artificial intelligence? Not women's, you can be sure, after reading *Machinery of Dominance.* Technological change does not of itself alter the long-lived pattern, 'men have technical skills and knowledge, women don't.'

Why do I like this book so much? Why did so many women, at several international conferences last year that I attended, press it urgently on others to read?

In *Machinery of Dominance* Cynthia Cockburn significantly advances the analysis of how men use technology to maintain the sexual division of labour. She comes to her conclusions not by theoretical argument but by painstaking and detailed research based on interviews with people actually involved in using and designing the technologies that underpin technological change in the workplace. In all she interviewed 196 people of whom 83 were women.

She investigated three areas of employment that are undergoing substantial technological change: the clothing industry where computer-aided design is altering the work of pattern-cutters, mail order firms where goods handling is being mechanised and radiography departments in hospitals where the use of body scanners (computed tomography scanning) is increasing. She also followed the three computer-based technologies back as near to their source of origin as possible, to the electronic engineering companies who design and distribute the equipment.

Her technique is to map out a field of issues emerging in the interviews and then to determine the range of responses to them. It is this approach which sets *Machinery of Dominance* apart from previous research in the field. She investigates with an open mind and draws her conclusions from what she finds in the interviews.

Machinery of Dominance is the one book I have read that I feel rings true to my experiences of working in technology, and that brings out the complexity of women's interaction with technology. I did genetic engineering long before the term became popular currency and I now work in another 'state of the art' technology, that of computing. I like working in technology, difficult as that notion is for some theorists to comprehend. And at last here is one woman writing about

technology that acknowledges that women too might actually like it, as the interviews with radiographers show.

But there is a cost to women of working in technology. Women have to fight continuously to be taken seriously as workers. Sexual harassment, says Cynthia, is the clearest expression that men wish to maintain rights in technology as their private property. In her interviews, Cynthia found that 'Whether trying out her competence as a stand-in forklift truck driver or sitting at a computer terminal in a roomful of male graduate engineers, the lone women is wary as a cat, adapting continually to avoid trouble'. Keep cool, be continually alert, avoid situations, keep your eyes lowered, wear modest clothes, don't be sexual — all these were strategies that women learnt to use to survive.

and power. Even though many men personally will never wield it, they do not need to'. She suggests that the action and interests of men lie behind the sexual division of labour, 'while a sexual division of labour at home and at work may or may not have advantages for capital, it can always be shown to benefit men as a sex.'

She does not try to fit her findings into a previously constructed political theory but builds and modifies theories on the basis of her findings. Her conclusions are the more radical because of this. She started out with the idea that 'of the pair of terms gender and technology, technology with it's resonance of the hard, the effect was the more powerful. Gender seemed ephemeral.' At the end of her research however she is now 'sure' that of the two 'gender is the more implacable and tyrannical'.

Apart from the drain of this continual attrition, the woman technologist has to endure being alone, in a way that no male technologist is required to be. The most popular presentation at the first European conference on *Women, Natural Science and Technology* held in Denmark recently, was by a Finnish engineer entitled *On Loneliness.* The engineer was of course female. The title and paper evoked a common experience for women scientists and technologists that I talked with, from all over Europe, East and West.

Men do not want women to work in technology, prevent us from entering the field and hinder and constrain us when we do manage to cross their barriers. Those of us who work in science and technology experience this daily. Cynthia Cockburn documents very well the exclusion mechanisms men use: the old boys network, the pub socialising, the prejudice of male colleagues. She says, 'in technology the exclusion of women secures men, as a sex, a very tangible form of authority

Cynthia Cockburn advocates 'women's own collective action for women's autonomy in technology' as the first priority for change. It's 'men who have always been the separatists', she maintains and what is now needed is separate provision for women.

There is so much in this book. On the train to the University of Kent recently, to give a talk on working in technology, I tried to pick out stimulating quotes, but gave up. Not because there were not any but because there were too many to use in an hour's seminar. The first time I read it, I found myself saying 'Yes, Yes, Yes', as I rapidly turned the pages. *Machinery of Dominance's* meticulous, insightful documentation of men and women's relation to technology at work is the best I've read.

Mary Jennings

The Cult of Information

Theodore Roszak
Lutterworth Press 1986, £12.95

The Cult of Information is an attempt to demytholigise and demystify computer technology. Author Theodore Roszak sees himself as the boy in the story of the emperor's new clothes, seeing through the pretentions of the computer experts.

He starts by discussing the concept of information as it is applied to computing. In particular, he looks at the grandiose claims of manufacturers who legitimise the dominance of computers as arbiters of knowledge. He does this well, as with his next section which tries to assess the validity of computers as educational tools. The attitude that the school without a computer is somehow disadvantaging its children is certainly knocked on the head.

But many of the criticisms he levels at computers could equally be applied to science in general, and the book is like a case study of the way science is used to provide excuses for the excesses of capitalism. It uses the particular situation of computers, but none of the things which have been claimed for computing are peculiar to computing, e.g. that it is neutral, that it is objective, that it provides the answers.

Big business makes these claims in relation to any science. The atomic bomb was sold in just this manner. Claims for objectivity and neutrality are dubious in any context, especially when put forward by those who stand to benefit from their commercial success.

Roszak then talks about the nature of thinking, after throwing in a few well placed quotes from various moguls of the computing industry who claim that computers not only think faster and more than humans, but also better. Such claims clearly cannot be vindicated, at least not at the moment, and this kind of debunking is always useful. If only there were more of it we might actually be moving towards civilisation, but alas we're not.

Towards the last third of the book things really start picking up. What seems well-meaning but rather tame in the early sections begins to take shape as more of an attack. This is obviously quite refreshing for those of us who hear nothing but how wonderful computers are and how they are going to change

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our lives. In fact, for those of us who harbour paranoid fantasies about the 'thought police', this is compulsive reading.

It is fascinating to find out that opinion polls based on computer analyses dominate American politics to such a profound extent. For instance during the last US Presidential election, Reagan altered his anti-Soviet stance primarily because the American public responded rather badly to his warlike attitude.

Reagan's main adviser on this was a man called Richard Wirthlin, and it was one of Wirthlin's proteges who developed the National Security Council's *Crisis Management Support and Planning* group. The group was developed to give Reagan an 'easily understandable' graphic representation of world events, to enable him to make decisions more ably with the 'facts' before him. The President was obviously presented with reams of 'unbiased' data about the overwhelming presence of communist spies and agitators stationed on Grenada. In fact it was from the group's headquarters that the invasion of the island was planned. One can only be grateful that Mrs Thatcher hasn't got a 'crisis group' of her own.

The military hoodlums running America's armies have used computers to make a map of Vietnam (and one of Thailand) showing which villages are hostile to US forces and which are friendly. The 'hostile' villages in Vietnam were bombed. I find this very frightening, not because this kind of thing is mapped out on computers, but because computers make it so much easier to accumulate this kind of 'information and give this kind of reasoning the appearance of logic or science, which makes it that much harder to counteract. Reading Roszak's book, I began to feel as if the whole world were some kind of huge video games arcade, with America alone allowed to play, and the rest of the world sitting round looking on.

This is a good book, very readable and quite useful, but it is only a case study of the way in which those in power will take and use any of humanity's tools to maintain their control over events, and their power over people.

Polly Green

The Voyage Home: Star Trek IV

A film directed by *Leonard Nimoy*

This thoroughly enjoyable film has Kirk, Spock, McCoy and Co travelling back to present day San Francisco, from the future. Their purpose is to find some Humpback Whales to return with them to the 23rd century in order to save the Earth from the fate of a mysterious craft which is threatening to destroy the planet unless its communications (consisting of Humpback Whale song) can be answered. That's the story. In the course of this adventure we are treated to brilliant comedy and great insight into the present human predicament, dealing with some of the ways we are currently mistreating our environment: from the dangers of nuclear power to the destruction of the riches of our biological world.

There are many nice little touches to this film which hints at a future in which racism and sexism are very much things of the past. With both Black women and Asian men, now in evidence as Starship captains, things point to the 'Federation' having instituted an Equal Opportunities Policy at Star Fleet Command. On the science side of things, the special effects and computer graphics are excellent. Overall however this is very much a film about people and good relationships between them. Gene Roddenberry, the creator of Star Trek has stated that he believes the success of Star Trek is because it is optimistic; it says the human race is going tc make it, and in a very civilised way. "Looking different and being different will be OK. We won't interfere with the evolution of other peoples and civilisations. These are not warships going out, but spaceships exploring for new life, furthering the ideas of humanity". I would add that it is a rare example where the lead male characters do not compete for wealth, power or women and obviously hold one another in great affection.

This is a film for anyone of any age and for those of us (facing another term of Thatcherism) who could do with a dose of optimism and a good laugh. I'd say 'don't miss it'. If only Mrs 'T' would disappear at 'warp speed'!

Ron Roberts

Computers for Beginners

Errol Selkirk
Writers and Readers 1986

Doug Bell & Jenny Owen

At last, the book we have been waiting for in the well-known *Writers and Readers* comic book series. Some good illustrations take the mystery out of binary numbers, and explain the general principles behind programming, for example, but otherwise — what a disappointment. To put it simply, the book is sexist, racist and anti-working class.

It is sexist because, for example, it includes gratuitous drawings of naked women. And it uses the word 'infomaniac', which is a silly pun on 'information' and the sexist word 'nymphomaniac'.

It is racist because it fails to adequately discuss the thoroughgoing international division of labour in computer manufacture and the insufferable working conditions of the women in South East Asia who assemble computers and other electronic products.

It is anti-working class because it does the usual job of dismissing the Luddites as loonies standing in the way of inevitable technological progress, rather than seeing their progressive and successful role in its historical context. The issue of work quality — deskilling, stress, and so on — is dismissed in half a page.

Instead of addressing important political issues the book goes off into the technological fantasy land of the possible future of artificial intelligence.

Another important aspect of computers that is not stressed enough is the role that the military have played in computers from the early days of Babbage (needs of the British navy), through the second world war (the atom bomb), the space programme (creating the need for minaturisation) and present-day 'defence' systems (pattern recognition and artificial intelligence for systems like Star Wars).

All-in-all the book takes the approach that computers developed due to the individual discoveries of great men (sic), rather than in response to political situations. There is no analysis of how it could have been, or how it might be.

REVIEWS

Why didn't the author and the illustrator of this book get in touch with radical groups who are involved in computing? It would have been easy, used valuable experience, and probably fixed the flaws. What we were looking forward to was a radical treatment of computers, in contrast to the usual hype. Instead it falls far short of its potential. It is a disappointment and a lost opportunity. Don't buy it, re-write it.

A World's Waste: Cumbria, Sellafield and Nuclear Processing

An exhibition

Ranging in style from a painting of the sunny opening of Calder Hall Power Station by the Queen in 1956, to photographs of contaminated post-Chernobyl food, the Brewery Arts Centre, Kendal, Cumbria, has produced a powerful exhibition. Called *A World's Waste*, it brings together the work of both artists and photographers to question the role of the nuclear industry, specifically British Nuclear Fuels Ltd.

Why is it, ask the organisers, that the nuclear debate is divided between hard to acquire factual knowledge and desperate emotional reaction? The exhibition peels away some of the protective layers of BNFL's public relations exercises to try and depict the invisible: radiation and it's consequences for the world.

Employment at the reprocessing plant at Sellafield is seen by one interviewee on video as the only stable element in an economy where most other industries are in decline. He admits that 'no one would work there if there was an alternative', but in many ways, BNFL has assumed the role of benefactor to the community.

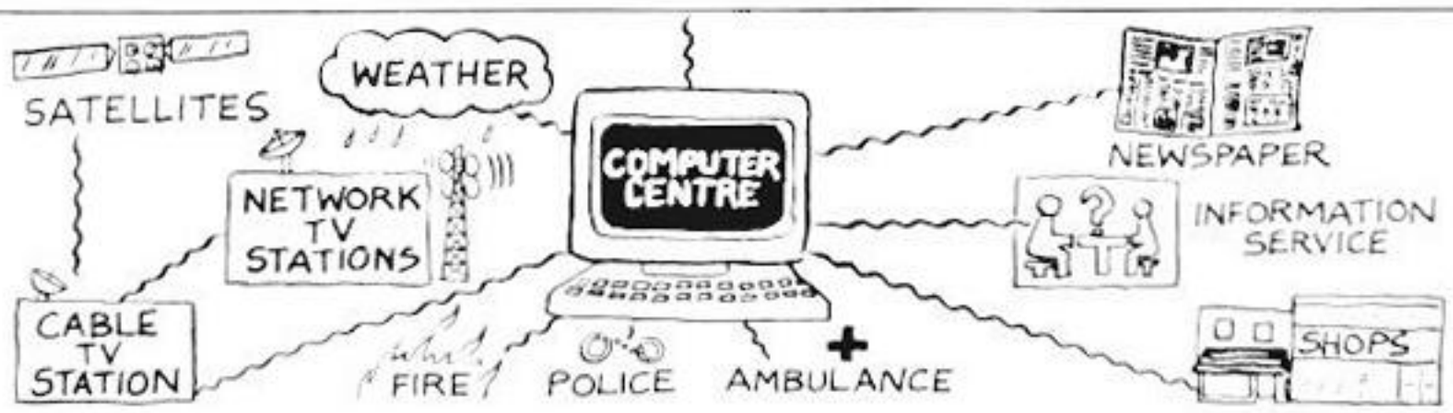
In their piece *Science Fictions*, Kit Edwardes and John Popadec have combined text and images to challenge both the limits of conventional photography and the 'truths' of BNFL. Photographs of the interior at Sellafield are paired with classical statues from the British Museum. If what we, the public, are told is acceptable, then all becomes simple. A hand holds out a child's balloon bearing the words 'Click On To Nuclear Energy'. If it is not, then the questioning must go deeper. For example, a faceless mannequin dressed as a scientist, from BNFL's own display, begs the question of who has access to 'truth' and 'knowledge'.

Philippa Goodall's *Utterings of Unquiet Women* brings a feminist perspective to the language of 'nukespeak'. The effects of radiation on domestic labour and the food chain are examined using everyday images, such as pints of milk and pots of jam.

Drawings of a derelict railway station in North London took on a new meaning for artist Eric Rimmington, when he discovered that it is still in use. Several times a week it is used to transport waste across the country from Sizewell to Sellafield. Like BNFL's advertisements, appearances can be deceptive.

Occasionally a little too dense, but generally using simple forms to convey complex ideas, this exhibition is an inspiring meeting point of art and politics. Currently showing in London until June 27, at two venues: The Photographers Gallery, 5-8 Great Newport Street, and The Ecology Centre, WC2. From there it moves to other parts of the country: Rochdale Art Gallery: 15 August to 15 September; Cardiff: 9 October to 15 November; The Watershed, Bristol: 5 December to 9 January, plus York, Hull and Carlisle during 1988.

A. Skelcher



LETTER

Dear Science for People,

It doesn't seem to me that Jonathan Rosenhead (SfP 63) attempts to answer my criticisms of the RSJ position (SfP 6 62). He writes that I did not mention a number of articles and implies that I gave prospective readers no idea of the content of *Radical Science Essays*. It's certainly the case that I did not list every article (reviews of essay collections often don't), but my review did indicate the range of issues covered in the book.

Rosenhead's main complaint appears to be that I have 'strong views' on RSJ and express them. Now in one way this objection is quite congruent with the RSJ perspective: theoretical positions express interests, the meaning of the positions *is* the interests; my review expresses 'strong feelings', therefore its content is nothing but those feelings.

But in another way it is a very strange objection. A common theme in radical criticisms of science is that its practitioners write and behave in an objectified, cold, abstract way. Yet an attack on the RSJ position which expresses strong feelings is apparently not allowed.

It feels to me as if I've breached some implicit code of etiquette, though where it comes from and why it should be adhered to is not made clear. Yes, my review is 'uncomradely'. But then I don't regard its targets as my 'comrades'.

The culture of radical science has constructed an alternative 'common-sense' which reproduces the worst features of established common-sense: the substitution of phrases for analysis; the pretence that assumptions are results; a moralistic double-binding which effectively labels dissent as treason.

David Murray

The Black Widow

A STORY

by Mick Kinshott

February 29th 2036:

Jirika proposed to me today. As she is 15 and I am 81, I took it as a silly joke whose cruel edge she is not yet mature enough to appreciate. We octogenarians are rare enough to be considered fair game, I can tell you.

But after a while, I realised she was staring at me with tears in her eyes. She was serious!

I'm afraid I struck her.

March 1st:

Now I'm less upset, I'll go over what happened yesterday.

We were walking up by the old prison. It's a favourite spot of ours. Jirika was bounding ahead through the piles of rubble on her young legs. I panted along after her, down several of the corridors that stutter from the one nearly intact cell-block. I found her standing behind one of the highest remaining sections of wall. We came face to face through some rusty bars.

"Be my future", she said.

Just like that.

I dropped the stick I was holding and the thud echoed around the overgrown exercise yard.

"Don't be silly", I said, moving away to get the full glorious view out across the bay. Jiri followed and put her hand on my shoulder.

For many minutes, maybe even half-an-hour, we watched the sunlight and the sea playfully tustling across acres of sparkle and spray. At least, I supposed "we" were enjoying the view, until I glanced at Jirika and found her staring at me in such a fixed manner that it suggested she'd been at it a long time already. For her, suddenly, there were no present views, landscapes, horizons. Her eyes were only on the future and for her the future was to be found nowhere but in my eyes softening towards consent.

"Why, Jiri, why?"

"Because I love you"

I was suddenly disgusted:

"How can you?"

"I want what you were and who you might have been rolled into one new human being. Isn't that the highest form of love?", she pleaded.

"Not what I am", I growled, "You don't want what I am"

"It's my future I want you to be. Don't you understand that?"

This is madness. Well, isn't it? What could I say to her? There's no way I can take these values seriously.

"You deserve another chance, George. There was a lot of good in you".

My hand lashed across her cheek. I didn't mean to do it. I hardly realised I had.

"Was?"

I'm afraid I must have packed an awful lot of bitterness into that one syllable.

"Love isn't lying either, George", she whispered, "I'm sorry but that is all you are, a living hint of what you might have been"

Eighty years at the back of the queue only to have that dished out to me. No, thank you.

March 4th:

As if I haven't got enough to worry about, Jiri was at me again today, in the canteen.

"George", she said, "There's nothing I'd rather do than carry your clone"

"I can't do it", I said.

"Why not?"

"I'm not ready to die. I don't want to die. I refuse to die!"

"You're selfish"

That's what she said: 'You're selfish'. And then carried on shovelling beans into her mouth as if we'd been talking about the weather.

March 15th:

Jirika's still stalking me. She's got no chance of changing my mind, but she won't accept that. There's a gulf beween us on this as big as the Grand Canyon. It's a pity, because its beginning to spoil our friendship's many other delights.

"Don't you see, George", she pleaded today, "that it's because I love you that I want to murder you"

Her face glowing, her eyes sparkling. She really thinks she's offering me something precious, flattering me. She's never seen or heard of a real murder. Blood, guts, rage, the sudden savage edge of hatred. She goes on about "the beauty of dying". Tell that to the millions who went in one end of 1995 and didn't come out at the other. Piles of stinking corpses! Our pyramids!

In the old days, we had capital punishment and abortion, even euthanasia in a primitive, sketchy sort of way. We never pretended they were other than grisly necessities. We didn't dress them up as "beautiful rituals" and "meaningful ceremonies".

How can Jiri begin to comprehend what goes on in my mind when I hear this new-fangled use of the words "marriage" and "murder" as synonyms? How can I tell her how loathesome and vile it sounds to my old ears?

March 17th

We'd made love, as we occasionally do, gently, slowly; a long, long simmer till the full flavour of our slightest motion fills our souls.

Jirika was happy, happier than usual if anything. She made me think of the good things before all the bad fell on our heads with such a mind-crushing thud. Laying there, perfectly at ease, stroking her moonlit-midnight skin, feeling her heart-beat against my arm, I was overcome with some temporary insanity. I said the things I'd vowed I'd never say to her.

I said' "Let's have a child, Jiri. Like they used to. Natural conception. Natural pregnancy. Natural childbirth"

She pulled away, slightly.

"Why?"

"Because that's what people do when they really love each other"

"I don't want our child, George. I want a new you"

"But you can have me as well. We'll marry, live together"

She pulled away, abruptly:

"I knew I was wrong to fuck with you. You always go like this, though you don't usually say it. Look George, quite apart from my own feelings, the Law is the Law. We all agreed. You say yourself that over-population was the big problem. So: never again. And that means 'One Person, One Future'. A new person is created, an old one has to die. It's humane, common sense, simply that"

"Christ"

"I don't want to choose between you or your child. I want both, and that is your clone"

"It's sick!", I spat.

"I think it's beautiful"

"You're sick! Find another stooge, Jirika. Count me out"

At the moment, I wished I'd never met her.

March 19th

Just two days after vowing never to see her again, I went cringing round her cabin, hoping for an 'accidental' meeting. Then, realising what an old fool I must look, I went in.

I snivelled and whined, I suppose, that's about the size of it:

"Jiri, I love you. I'll do anything for you"

And: "I'll live backwards. I'll become a baby again for you"

And: "Please, Jiri, please. Don't sentence me to death just when I've tasted happiness"

She glared at me, spoke icily:

"There's no going back, George. I'm 15. I've got to create a future, not revive a past. You will live again, a second chance, think of that. All the opportunities you missed, all the joys you by-passed, all....."

"No!"

I ran. Yes, I flogged my 81-year-old limbs for twenty minutes stumbling through the forest, howling, weeping.....

March 25th

We went up to the old prison again, but hardly mentioned the Great Proposal. A sort of truce has been implicitly agreed.

But at one point, Jiri waved her arm around the ruins and said:

"You know. I've watched some old videos trying to understand why you used to lock people up here. I know all the facts, the arguments, the circumstances. But I can't quite grasp it. The rationale is just beyond the point at which my mind cuts out. You claim your civilisation was more humane in many ways than our communities are now. How can I believe that? There's no evidence extent for anything but rape of the environment and irresponsible reproduction"

I was about to protest that I personally never locked anyone up or.....

"Look at this", she continued, tugging at those same rusty metal bars through which she'd first brought up the Unmentionable Matter.

"Bars on windows! I mean, George, really! Yet under all that savagery and shit you got drowned in, there must have been seeds of something better. And those seeds might yet germinate....."

I changed the subject. At least, in the bad old days, we knew the equation of marriage and murder was a music hall joke.

April 1st:

On impulse, I went to the library this morning. I settled into a booth with a tape of the mating habits of the Black Widow spider. I've never been much good at these video machines and, before I could stop it, half the tape had flashed through. I messed up my attempted correction too, because instead of a fast rewind, I got a slow one, with screening. Technology, thank goodness, has not eradicated serendipity — just given it whole new pastures to graze in.

As I sat there watching the female spider biting her mate back to life, every cell of my body and mind began to vibrate in sympathy with this bizarre affirmation of life. The will to survive! That's the ultimate guts of it all! That's what god started as on the shop-floor! Even when life is shrivelling, rotting at its heart, it still flings itself outwards and upwards in a frenzy of survival-lust.

In the erupting of this euphoria, perversely, I accepted for the first time that my clone would come into being.

Not to please Jirika, particularly.

Not for social approval or to escape the namby-pamby solicitations of those meant to uphold the Law.

Not just because I'm too tired to struggle on.

Not at all because I've come round to the new ways by even one single notch.

Perhaps the dinosaurs had big enough brains to comprehend what our larger brains would do to this Earth, and got out while the going was good. Who said that? Some comic back in the old days, no doubt.

No, it was at my most impervious to all the contemporary customs and practices, at a moment when I felt again fully in control of my own destiny that I decided to give Jirika the go-ahead. It won't be "murder", though I'll let them think it is. It will be a drawing of a line under all that's me and essentially mine.

I will permit Jiri to carry my clone. I will die. But I will do both in the same spirit as I lived. Believing them absurd, meaningless acts. And, by virtue of that belief, above it all. Floating clear under a balloon of contempt for all culture, all creeds, all laws.

Death by self-indulgence! Yes, that sounds right. Appropriate. After all, that was my generation's most unique contribution to human history — the rational mind that thinks itself with impeccable logic to a sticky end.

I was thrown out of the library for laughing. Roaring like a hyena, rather. At least I would've been 'thrown out' if they had the guts now to do things in the robust old ways. These days you do anything a bit flamboyant and every one within half a mile turns into a blasted social worker!

April 14th

Spent a lovely night with Bob and Andrea, my two oldest friends, way out to sea in a small boat, drifting, not even looking to see what rocks or ships might be bearing down on us. A night of irresponsibility — we even threw a couple of our empties into the sea!

After many dreamy minutes laying on the cushions, staring at the sky, Bob said:

"It's as if the past never happened"

I think Andrea and me knew what he meant without him having to dot the "i's and cross the t's". Throughout our youth, we allowed all our energies to be harnessed into roles and conformities we didn't choose, even the rebellious ones. God, I was even a policeman for a while, guarding the front gate of civilisation against bums, drinks and dirty old men while round the back my bosses were plundering the garden to death. We thought of ourselves as playing an important part, but never bothered to enquire into the significance of the whole.

We watched the last rays of day stitch themselves into sacks of darkness. Since Jirika announced my agreemen neither Bob nor Andrea have breathed a word of it. Someho I felt we weren't going to spend much longer walking the tightrope of talking around Jirika without actually mention ing her. I feel that they think I'm a fool, but don't like to sa it.

"Have you created your future yet, Andrea?", I asked.

"No"

"Have you, Bob?"

"No"

"Neither have I"

It was a poignant moment. Only three people on earth, that I know of, could have appreciated it fully. Us. You see, no-one — not even Jirika — has asked me about *my* future. She assumes I chose years ago because everyone chooses early now. The three of us in the same boat, with the power to murder legally and choosing not to exercise it, nor even allow it to be mentioned more than this once between ourselves even.

"We're living fossils", said Andrea.

We opened a new bottle of the finest local wine and watched the handful of visible stars fighting their impossible fight against the engulfing talons of the now fully fledged night.

The past is a private joke that has become too private to carry on being a joke.

Bob was still feeling philosophical:

"I feel as if I lived outside history. Was used by it, like a tool even. I was called on suddenly to perform a task for which nothing in my life up to then had prepared me. I did my best, not knowing why. And ever since I've been a husk, not even any sadness or self-pity"

"I suppose we did well", murmured Andrea, near one of those dozes with which we punctuated these long, lazy nights. "Less disease, less hunger, less violence.....no harmony.....with.....nature.....and....."

She was alseep.

The last light had moved on, over the horizon, into others' lives. We were drifting. I felt utterly remote from everything. It was excruciatingly beautiful.

April 23rd:

Jiri was superb. She nearly made it all worthwhile. Her dream was in process of being made flesh inside her, and she was radiant. For her, the probing scalpels might have been the pricks of angels. I held her hand throughout and when it was over, just a couple of minutes, Jiri said "Thank you" and wept. An odd worm of sentiment wriggled beneath even the cynical old stone of my heart.

That was the second stage, the implantation. The first was not so ecstatic. They yanked my head back and scraped a hooked, gouging weapon across the roof of my mouth. I dived straight into the lavatory and threw up. Conception, truly, is not what it used to be.

But really, it was just one more bit of me ripped away. We all die by degrees; memory last, unfortunately, in my case.

Oh yes. And after she'd said, "Thank you", she pulled my ear close to her lips and whispered:

"You're inside me now"

I smiled; I hope I smiled; I tried. Always pulled outwards, scattered, lost to the urgencies of the times, suddenly here I am, at 81, inside someone else before I've ever been truly inside myself.

May 17th

Went up to the ruined prison with Jiri today. Quite like old times. A month ago, I mean by that. Jiri's impregnation is an event that looms so large I am forbidden to look over it into anything more grimly 'past'.

We arrived on the roof early and watched dawn going through its paces.

"It's beautiful!", signed Jiri.

I stretched my weary old legs.

"Utterly", I agreed.

Jiri is aglow with dawn inside her and out. I don't want to die. But I don't want, particularly, to live either. Sounds like a hopeless, despairing state to be in, as I write it in cold ink, but it's not really.

November 10th

Jirika's womb grows bigger and bigger. She is magnificent.

I have been busy clearing up the dustier corners of my life. Not many of them, but some obstinate cobwebs nevertheless. I've thought that I should have written this diary more fully for the Archive, or even been less of an anachronism and made a video like the others do. But no. The sole creation of my final year will have to be the perfect facade of my smile.

"As soon as you're born", said Jiri, "We'll discuss the detail of your death"

I don't cringe anymore. The smile persists, like a cave painting left over from neanderthal times.

"I can hardly wait", I think I replied.

I've thrown away all my papers and possessions; given away what little I valued. My life grows smaller and smaller

January 7th: 2037:

I watched the birth. I thought it would cause me a few heartquakes, but it didn't. I think maybe I've aborted everything in my mind, now. Beneath the calm exterior is an even calmer void.

'One Person, One Future': a good enough slogan to martyr some-one on. Better than 'My Country Right or Wrong' or 'Long Live the Dictatorship of the Proletariat', I suppose.

She still hasn't asked me about my 'Future' incidentally.

Before Jirika held the baby out to me, it waved its tiny frail legs violently for a second or two, and something insistently alive inside me kicked in union.....But that was my sole lapse. Otherwise, the smile.

I watched the baby crying and my eyes nearly misted up in sympathy. But I'm too dessicated now, sucked dry by cloying years, compromises, timidities. My heart goes on, but at last my memory is nearly still. That is yet another thing that Jirika never understood, how the memory can become a more truly vital organ than either heart or lungs or stomach.

She held up the completely white baby in her black arms for me to get a closer look. I felt no involvement, no interest; and after Jiri and son had gone, I watched the afterbirth being flushed and hosed away; and still, the smile.....

January 9th

Andrea used the phrase, "Your son", today. I stopped her dead:

"No, Andrea, not my son, me"

She looked at me hard. I can't even speak honestly to myself now, Andrea, so don't exercise those eyes so. Leave me alone.

January 23rd

Jirika was particularly animated today:

"We must make the planning of the baby's life and the planning of your death an organic whole."

We?

The three of us were sunbathing on a secluded beach.

"Your death must be painless"

"Yes"

"And dignified"

"Yes"

"Any ideas?"

"No"

February 14th:

It has been decided.

There will be a party of welcome for the new baby. All Jiri's friends will be there, hundreds, thousands of them.

Simultaneously, there will be a party of farewell for me. Both my friends were invited and politely declined.

I'd already told them that's what I'd do in their place.

I shall enjoy the party.

I shall seal myself in the coffin.

I shall take a slow-acting poison and fast-acting hallucinogen combined.

I shall die as those I love celebrate around me.

That's the theory. In fact, I'm even more bored by my death than I am by my life.

I mean, do they really think I need technicolour fantasies to help me face the end? Haven't that great stack of videos in the Archive given them the slightest insight into what we went through? Don't they know I've personally witnessed more deaths than dawns?

I don't need medicinal aids to face up to death, my friends. Don't deny us oldsters the one skill we practiced and practiced, and honed to perfection!

February 15th:

Spent the night with Jiri. The first since I agreed to all this. She hugged her son, weaving around him a spell of loving sounds. He — I cannot bring myself to use 'his' name — sought out her breast, and the last of me died, yet again.

She has only room for one sun in her sky and that one suckles with a hunger that is at once so savage and so serene I can hardly bare to watch.

February 16th

It's the party tomorrow. Everyone smiles at me, waves, nods. People who've never addressed me before grasp my hand and talk expensively about themselves and their projects. I know the theory — ease me towards death by demonstrating life will go on — but it offends with its slickness and lack of spontaneity.

'Hi there George', said one oddball I'd never clapped eyes on before, 'I'd like to share my new wife with you!' He meant for me to shake her hand and say 'hello'. Things have gone full circle, and now innocence and evil are one.

February 17th

I'm in my coffin now, dying, embalmed by clinking glasses and shallow laughter. I'm having a good trip in green silk padding.....

Am I hell!

In fact, I'm writing these words out of ear-shot of the whole charade, I'm up on the roof of the old prison. I've decided that I must go through with my feelings about all this. I've tried to suppress them, but I can't. I'll even leave this record after all, in case someone else, someday, may think our 'old' values weren't all bad.

In a few minutes, I'm going downstairs. All the way. Into the basement. Below that into the drains. I've found a trapdoor down there. When I first pulled it open, I thought I'd found the Devil's Arsehole. There was a vile, violent, volcanic upthrust of fetid, stale, stinking air. Not air at all — it can't be breathed — just pure stench.

It is the prison cess-pool, unemptied since this building was last used.

That's where I belong and that's where I'm going. Head-first. Just a plop, and hardly a bubble protesting, and I'll be swallowed finally into my past. It was a vain struggle.

I will be at one again with the millions I left behind, the millions who never made it to this millenium. In this sordid, solitary ritual I shall expurgate all guilt that was caused by my necessary, painful survival.

Perhaps, you Jiri, can understand this a little? One day maybe?

Take good care of ..... 'me'.

* * *

We would like to contact the young woman who has won the under 18 age group of the SF competition but unfortunately we have mislaid her details. If anyone knows the young woman from Montpelier Grove, NW5, who submitted three short stories for consideration, please contact the BSSRS office urgently. Tel: 01-607 9615.

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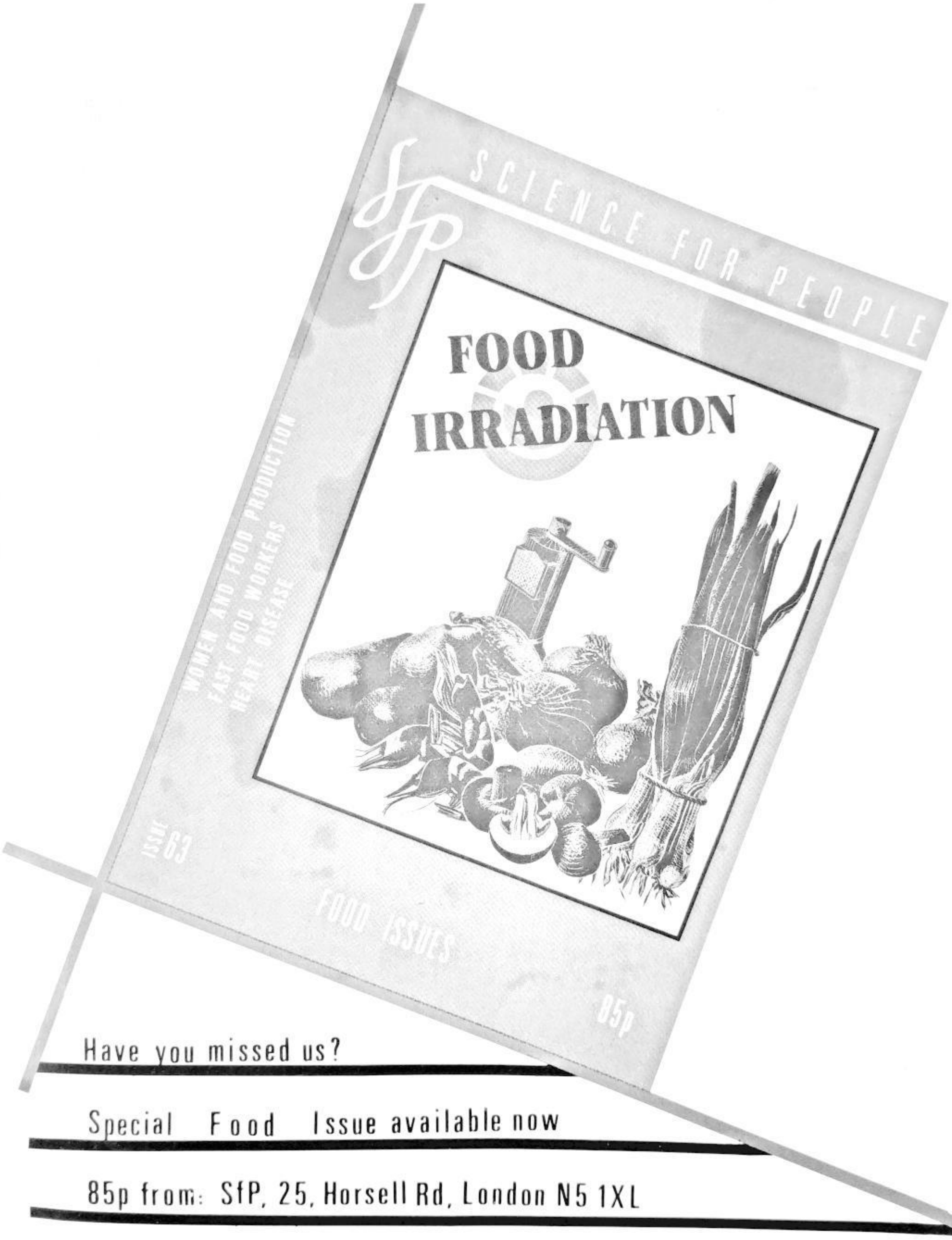

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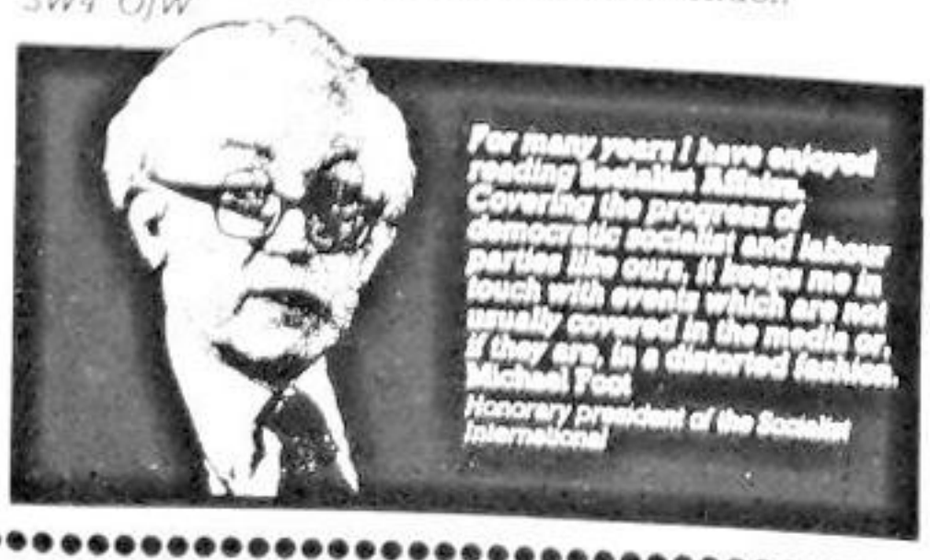
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